ORDER NO. VKD86101016C1

Service Manual

System Camera
WVP-F10

8X Auto Focus Lens
WV-LZ14/8AF

1″ Electronic Viewfinder
WV-VF01

Grip Shoulder
WV-GR12

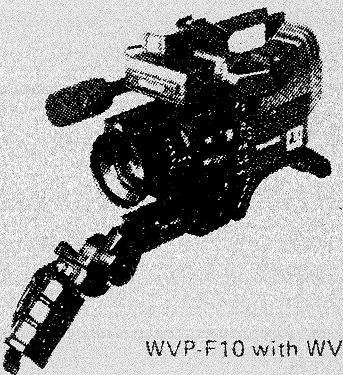
Gen-lock Adaptor
WV-AD36

12X Power Zoom Lens
WV-LZ14/12

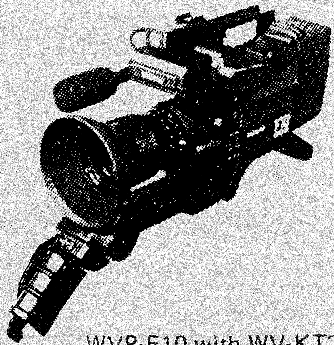
Stereo Microphone
WV-MC12

Cheek Pad
WV-Q43

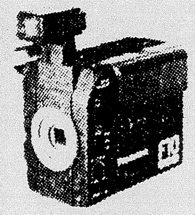
Vol. 1
Vol. 2
Vol. 3
Vol. 4



WVP-F10 with WV-KT100

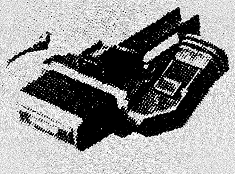


WVP-F10 with WV-KT200



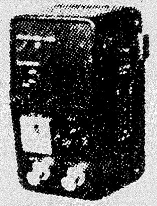
WVP-F10

WV-LZ14/8AF

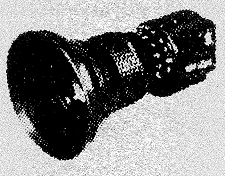


WV-VF01

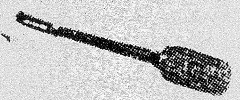
WV-GR12



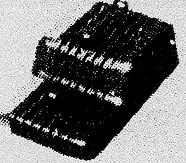
WV-AD36



WV-LZ14/12



WV-MC12



WV-Q36

CONTENTS

Vol. 1 Circuit Description .... 1-1 ~ 1-67
Vol. 2 Adjustment Procedure .... 2-1 ~ 2-37
Vol. 3 Block Diagrams/Schematic Diagrams/Conductor Views .... 3-1 ~ 3-88
Vol. 4 Replacement Parts List/Exploded Views .... 4-1 ~ 4-34

National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Service Manual

Vol. 1

Circuit Description

System Camera
WVP-F10

1" Electronic Viewfinder
WV-VF01

8X Auto Focus Lens
WV-LZ14/8AF

Grip Shoulder
WV-GR12

Gen-lock Adaptor
WV-AD36

Vol. 1

CONTENTS

SPECIFICATIONS .... 1-2 ~ 1-5

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS .... 1-6 ~ 1-14

CIRCUIT DESCRIPTION

1. PRINCIPLE OF CCD COLOR SOLID STATE VIDEO CAMERA .... 1-15 ~ 1-16
2. CCD BOARD .... 1-17 ~ 1-23
3. CCD DRIVE BOARD .... 1-24 ~ 1-30
4. POWER/SYNC BOARD .... 1-31 ~ 1-36
5. PROCESS BOARD .... 1-36 ~ 1-43
6. MICROPROCESSOR BOARD .... 1-43 ~ 1-53
7. AUTO FOCUS BOARD .... 1-54 ~ 1-63
8. AUDIO BOARD 1-64
9. ELECTRONIC VIEWFINDER (WV-VF01) .... 1-64 ~ 1-66
10. GEN-LOCK ADAPTOR (WV-AD36) .... 1-66 ~ 1-67

SPECIFICATIONS

WVP-F10

Power Source : 12V DC
Power Consumption : 5.7W (Min), 18W (Max)
Scanning : 625 lines/50 fields/25 frames per second
Pick-up System : Integrated colour mosaic filter single chip CCD system
Pick-up Element : 2/3", 574(H) x 581(V) pixels, interline transfer CCD with colour mosic filter
Video Output Level : 1.0Vp-p PAL composite/75 ohms
Horizontal Resolution (Luminance) : 380 lines at center
Signal to Noise Ratio (Luminance) : 46 dB
Illumination Required : 1400 lux at F4.0
Required Minimum Illumination : 7 lux at F1.4 lens with +18dB gain-up at 30 % Luminance signal
10 lux at F1.6 lens with +18dB gain-up at 30% Luminance signal

Internal Microphone : Detachable Stereo Electret Condenser Microphone (optional : WV-MC12E)
External Microphone : -65dB, 600 ohms, unbalance M3 jack x 2 (Stereo)
Audio Output : -20dB/-60dB (Selectable) High impedance
Earphone Output : 8 ohm M3 Stereo Jack

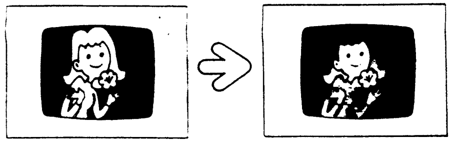
Lens :	WV-LZ14/8AFE (optional)		WV-LZ14/12E (optional)		WV-LZ15/12 (optiona	
(1) Auto Focus :	Yes		No		No	
(2) Zoom Ratio :	8X		12X		12X	
(3) Focal Length :	10.5 - 84mm		10.5 - 126mm		10.5 - 126mm	
(4) Maximum Aperture Ratio :	1 : 1.4 (F1.4)		1 : 1.6 (F1.6)		1 : 1.6 (F1.6)	
(5) Focusing Range :	1.3m - ∞		1m - ∞		1m - ∞	
(6) MACRO Range :	5cm - 1.3m		5cm - 1m		5cm - 1m	
(7) Iris Range of AIC :	1.4 - 22, C		1.6 - 22, C		1.6 - 22, C (Automatic Auto Lo or manual selectable)	
(8) Field Angle :	TELE	WIDE	TELE	WIDE	TELE	WIDE
Diagonal :	7.3	55.6	4.9	57.4	4.9	57.4
Horizontal :	6.1	44.3	4.1	44.3	4.1	44.3
Vertical :	4.6	39.9	3.1	33.9	3.1	33.9
(9) Filter Diameter :	58mm,	P = 0.75	72mm,	P = 0.75	72mm,	P = 0.75
(10) Flange Focal Length :	17.526mm		17.526mm		17.526mm	
(11) Zoom Speed :					Zooming/Focusing : controlled by lens control kit WV-LK11	
FAST :	Approx. 6 seconds		Approx. 7 seconds			
SLOW :	Approx. 9 seconds		Approx. 10 seconds			

Lens Mounting : Bayonet mount
Viewfinder : Black and White 1 Electronic Viewfinder with character display (optional : WV-VF
White Balance : Auto Tracing White-Balance (ATW) or Manual Setting (AWC)

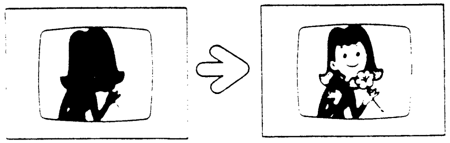
10 pin Camera Cable Length : Approx. 6.7 feet (2m)
Maximum 10pin Camera Cable Length: Approx. 67 feet (20m) between camera and portable VTR/VTR/Power Supply
10 pin Connector Informations :
1. Video In/Out
2. Ground for Video
3. Serial Data Pulse (or Open)
4. Rec Tally and Serial Clock Pulse
5. Standby + Audio (CH2(R)) Out
6. Rec Start/Pause out
7. Audio (CH1(L)) out
8. Ground for Audio
9. Ground
10. +B/12V In

Operational Ambient Temperature : 0°C - +40°C (32°F - 104°F)
Operational Ambient Humidity : Less than 90%
Camera Mounting : One 1/4 -20 threaded standard camera tripod
Dimensions :
WVP-F10 only : 138.5(W) x 114(H) x 136(D)mm
WVP-F10 with WV-KT100 : 248(W) x 246(H) x 437(D)mm
WVP-F10 with WV-KT200 : 248(W) x 246(H) x 476(D)mm
Weight :
WVP-F10 only : 0.9kg
WVP-F10 with WV-KT100 : 3.1kg
WVP-F10 with WV-KT200 : 3.45kg

Weights and dimensions shown are approximate.
Specifications are subject to change without notice.



When the background is bright and the object appears to be too dark, adjust this knob to open the lens iris opening.



At the centre detent position, the auto iris is operated in standard condition.

Note : (1) Whenever the iris is manually adjusted, this knob should be reset to the centre detent position after the camera is used under unusual lighting conditions.

(2) When the camera is aimed at the scene which contains excessively bright object such as the sun or lamp, blue vertical bar may appear in the picture. This is peculiar phenomenon of CCD and it is normal. The camera should be operated avoiding such scene.

(3) This control should be set to the AUTO position when the camera is used with the remote control unit (RCU).

10. Lens Connector (20P) (LENS)

This connects the auto iris power servo control zoom lens which automatically adjusts the incoming light intensity by changing the lens iris.

11. Power Indicator

The power indicator lights red when the power source is applied to the camera.

12. Standby Switch (STANDBY/ON)

This switch is used for longer battery operation and selects the conditions of the camera and the Panasonic portable VTR as:

ON : The camera and the portable VTR are operated normally.

STANDBY : The cylinder motor of the portable VTR is OFF with the tape threaded and the camera functions are also OFF, except Sync and Microprocessor.
The unit is in operating condition after necessary adjustments.
When the camera and portable VTR are not used for [illegible] minutes, set the switch to the STANDBY position.

Note :
1. When the camera is operated with some of other manufacture's VTR, the VTR may operate incorrectly in the standby mode of the camera.
2. The white balance set previously is memorized even if the standby switch is set to the STANDBY position.

13. Colour Phase Control (COLOUR PHASE)

This control allows fine adjustment of the colour phase. This control should be adjusted for fine colour matching adjustment while this camera is used with RCU adaptor and RCU.

14. Strobe Effect Shutter/Normal Selection Switch (SES/NORMAL)

This switch selects the strobe effect shutter function.

SES : The camera is in strobe effect shutter and video signal of 1/1000 sec in every 1/50 fields is provided from the 10-pin VTR Connector (28) and 32-pin Connector (26).

NORMAL : Normal video signal is provided from the 10-pin VTR Connector (28) and 32-pin Connector (26).

17. Level Indicator Switch (LEVEL IND ON/OFF)

When this switch is set to the ON position, pictures which exceed the specified level (100%) produce a zebra pattern in the viewfinder.
When the background is bright and the object appears too dark in automatic iris control mode, adjust the lens iris in the manual iris control mode so that the object in the viewfinder is almost developing a zebra pattern. In this case the background may become overexposed.
Set this switch to the OFF position in the automatic iris control mode.

18. Internal Microphone Connector (INT/MIC)

When an optional microphone WV-MC12E is used, connect the microphone connector here.

19. Flangeback Adjustment Gear

Flangeback of the camera can be adjusted by rotating this gear clockwise or counterclockwise.

20. Lens Release Button

When removing the lens, press this button to unlock the bayonet mount and rotate the lens approx. 65° clockwise.

21. External Microphone Connector for Stereo (EXT MIC MONO CH1 (L)/CH2 (R))

An external microphone with output level of approximately -70dB can be connected to this M3 connector.
When an external microphone is connected, the internal microphone is mechanically disconnected.
When the mono audio VTR is connected, the only CH1 (L) microphone can be recorded.

22. Colour Adjustment (GAIN R/B)

The red and blue colours are balanced by adjusting these control and preset at the centre position which usually provides accurate colour reproduction.
However, under some conditions it may be necessary to compensate by adjusting these controls.
To obtain the best possible colour, set these controls at the centre position in both the AWC and ATW white balance mode.

23. Backup Battery Compartment

The backup battery (AAA size) is installed into this compartment to memorize the internal title and also to function the date and time continuously when the camera power source is off.

24. Audio Level Selection Switch (AUDIO -20dB/-60dB)

Two audio output levels for the VTR can be selected : -20dB or -60dB. It is factory-set to the -20dB position.

25. Stereo Earphone Jack (M3) (EAR)

When the stereo earphone (not provided) is connected, the stereo microphone sound of the camera can be monitored. When the mono earphone (not provided) is connected, the CH1 (L) mono microphone sound of the camera can be monitored.

26. 32-Pin Connector

This connector is for a connection of an optional AC adaptor WV-PS03, Gen-lock adaptor WV-AD36E or RCU adaptor WV-AD37E.

27. DC Power Selection Switch (DC POWER EXT/VTR)

This switch selects the power of the camera as follows.

EXT : This position is used for selecting the power source AC adaptor WV-PS03, RCU adaptor WV-AD37E or Gen-lock adaptor WV-AD36E.

VTR : This position is used for selecting the power source from VTR.

28. 10-Pin VTR Connector (VTR)

Connect the detachable camera cable here. Be sure the cable is fitted securely to the connector.

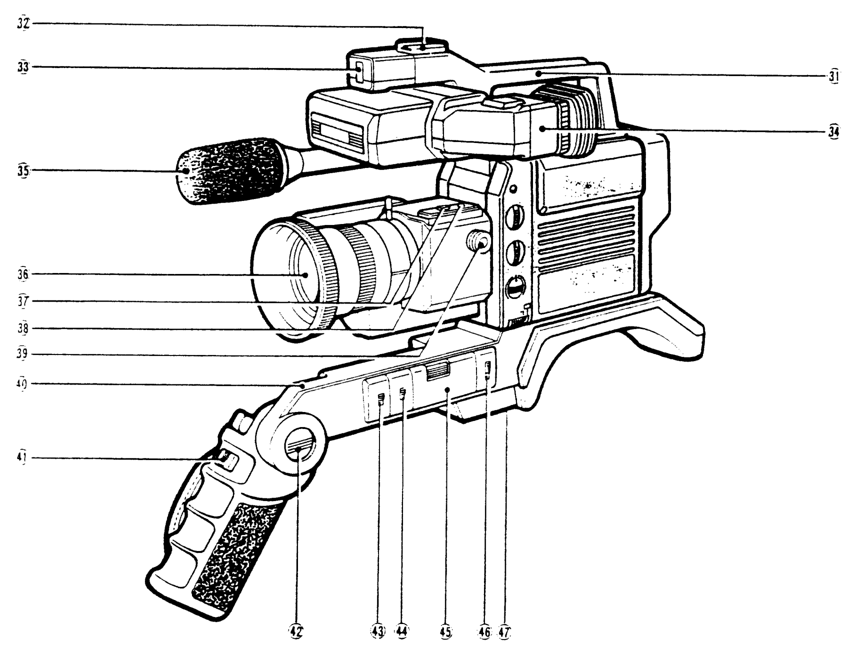
29. VTR Compatibility Switch (RUN, +/−)

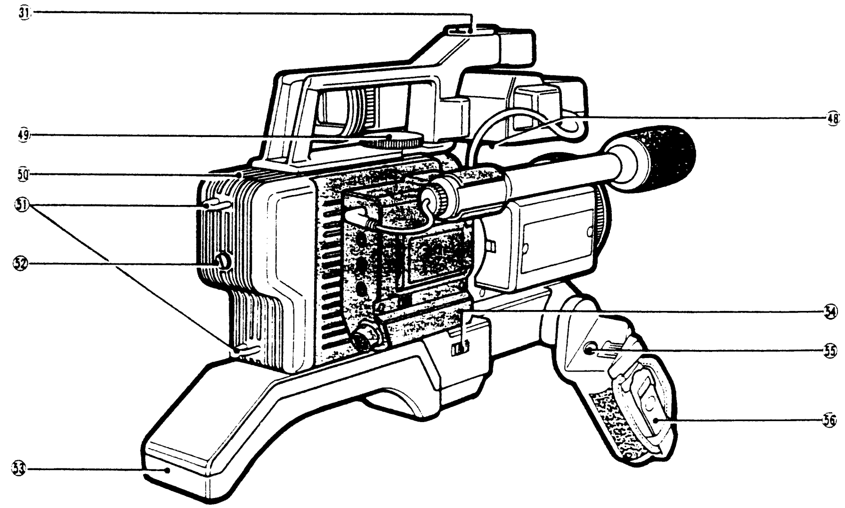
The logic level of the camera trigger may be incompatible and reversed, so that the VTR pauses when it should run and vice versa. In this case, set the switch position to other side.
When this camera is connected with Panasonic portable VTRs, set the switch to + position.
When this camera is connected to a VHS portable VTR of another manufacturer, set the switch to − position.

Note : Set the VTR Compatibility Switch (RUN + / −) on the camera to the + position when using the RCU.

30. Control Panel Cover

Press and pull the cover outward for opening the cover.





31 EVF Mounting Bracket

This bracket comes with electronic viewfinder WV-VF01E (34) and has connector of ATW sensor (33), Accessory shoe (32) and EVF mounting mechanism.

32 Accessory Shoe

The accessory shoe is used for attaching an optional Full Keyboard Titler WV-KB12E.

33 ATW (Auto Tracing White-balance) Sensor

This sensor comes with camera head WVP-F10E. This sensor detects characteristic/colour temperature of light source and controls the gain of red and blue signal individually and automatically in order to set the white balance automatically when the White Balance Selection Switch (5) is in the ATW position.

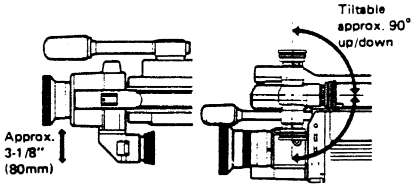
Note : Do not block the sensor during the ATW mode.

34 Electronic Viewfinder (EVF) (Tiltable) (WV-VF01E)

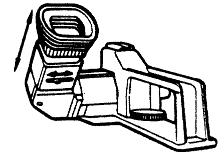
This small 1 inch TV monitor shows exactly what the lens sees.

The viewfinder is tiltable and can be adjusted up or down (approximately 90°) from horizontal.

It can also be slid approximately 3-1/8 inches (80mm) laterally.

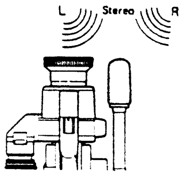


The diopter of EVF eyepiece can be adjusted between −1 and −3 by sliding the diopter adjusting knob.



35 Stereo Microphone (WV-MC12E) (For Stereo Audio VTR)

The stereo microphone is unidirectional and is more sensitive to sounds coming from the direction.



36 8X Auto Iris/Auto Focus Power Zoom Control Lens (WV-LZ14/8/AFE)

This is a 10.5 - 84mm lens for the 2/3 inch image size with automatic & manual iris control, through the lens (TTL) auto focus with 3 zone select & manual focus control and 2 speed control power zoom. It has a bayonet mount and F1.4 maximum aperture. Enlarged close-ups with macro function can be made at a distance of up to 5cm (2 inches).

37 AUTO/MANUAL Focus Selection Switch (AUTO/MANU)

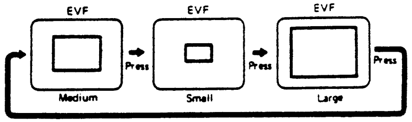
This switch can select the mode of the auto focus lens as follows.

AUTO : Auto Focus operation

MANU : Manual Focus operating or Push-Auto Focus operation.

38 AUTO FOCUS ZONE/PUSH AUTO Button (PUSH AUTO/ZONE)

When the AUTO/MANUAL Focus Selection Switch (37) is set to the AUTO position, the detecting/focusing zone can be selected by pressing this button and the frame marker of focusing zone is displayed in the viewfinder.



When the AUTO/MANUAL Focus Selection Switch (37) is set to the MANU position, the automatic focus can be performed by pressing this button (PUSH AUTO).

39 Iris Selection/Manual Control Knob

This knob is used to select the iris mode as follows.

- o Auto iris control : Push the knob for auto iris operation.
- o Manual iris control : Pull the knob for manual iris operation and turn the knob to close or open the lens iris mechanically.

40 Grip Shoulder (WV-GR12E)

This is a grip shoulder for ENG use of camera and camera can be mounted on the grip by one-touch.

41 Power Zoom Control (W(Wide)/T(Tele))

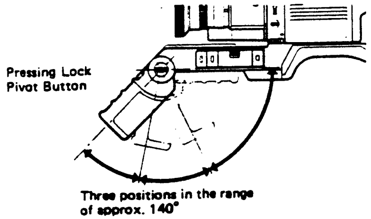
A tele/wide picture can be observed by pressing this control to zoom in/out.

The zoom speed can be changed as follows in case of WV-LZ14/8AFE.

- o Push all way down : Fast : Approx. 6 seconds
- o Push half way down : Slow : Approx. 9 seconds

42 Adjusting Lock Pivot Button

The three angle positions of the handheld arm can be adjusted by pressing this pivot button.


Pressing Lock Pivot Button
Three positions in the range of approx. 140°

43 Fade-in/out Button (FADE)

This button can be used to fade-in or fade-out recordings for video and audio.

When the button is pressed the letter F is displayed in the viewfinder.

The letter F indicates that the camera is ready for fade-in or fade-out.

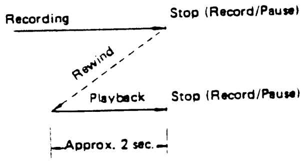
To start the fade-in or fade-out, press the Recording Start/Pause Button (55).

To cancel the fade-in or fade-out before starting it, press Fade-in/out Button again.

44 Rec Review Button (REC REV)

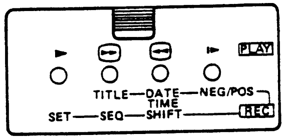
When this camera is operated with Panasonic specified portable VTR such as NV-180E, this function operates and this button is only activated in the VTR's pause (Record/Pause) mode.

When this button is pressed after recording and the VTR is in pause mode, the VTR automatically rewinds the tape for quick review and plays back the tape for approximately 2 seconds and stop (Record/Pause) at the position of the end of previous recording.



45 Keyboard Panel

Inside this panel, four push button switches are installed as follows.



46 Record/Playback Selection Switch (REC/PLAY)

This switch selects the function of the switches installed in the keyboard panel and specified Panasonic portable VTR such as NV-180E as follows.

	VTR	Graphics
REC :	Set to Rec/Pause mode.	Can be set or display
PLAY :	Set to Play/Pause mode and PLAY, FWD, REW, SLOW can be controlled.	No function at all

47 Tripod Mounting Hole

This is standard N.C. 1/4 inch-20 thread hole for mounting the camera on a tripod.

48 EVF Release Spring

When detach the electronic viewfinder, depress this and slide out the electronic viewfinder.

49 EVF Mounting Bracket Lock Screw

Fix the EVF Mounting Bracket onto the camera head by rotating this clockwise.

50 Cheek Pad (WV-Q43E)

When the camera head is used as ENG configuration, attach this on the rear of the camera head.

51 Hooks for Camera Strap

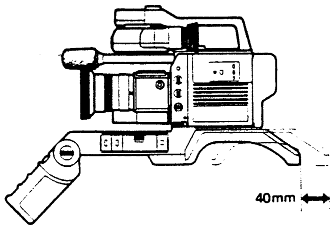
When use Camera Strap (WV-Q44E), hook the both ends of Camera Strap.

52 Cheek Pad Lock Screw

Fix the cheek pad on the rear of the camera by rotating this screw clockwise.

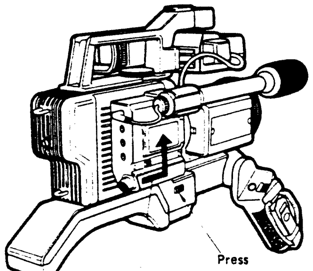
53 Adjustable Shoulder Pad

The shoulder pad can be extended approx. 1.5 inches (40mm) for comfortable position.



54 Grip Release Button

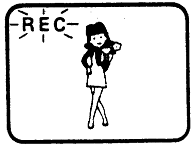
While pressing this button, slide the camera head forward and pull the camera head up for detaching the grip shoulder.



Slide forward and lift up

55 VTR Start/Pause Button

This push-push type switch is used to change VTR mode from Record/Pause to Record. Push the button once and the VTR will start to Record as shown by the blinking REC graphics in the viewfinder.

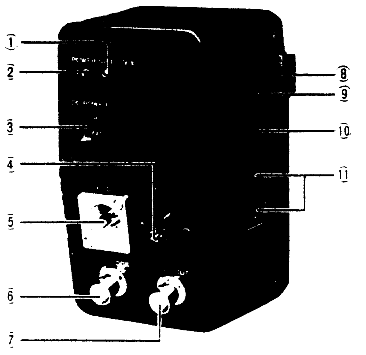


Push the button again to Pause (Record/Pause) the VTR and the blinking REC graphics will disappear.

Note : When the REC graphics indication and VTR Start/Pause operation is reversed, change the position of VTR compatibility switch (RUN, ⊕/⊖) (29).

56 Adjustable Handhold Strap

The handhold strap can be adjusted for holding the camera firmly.



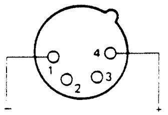
1. **Gen-lock Indicator (GEN-LOCK)**
   This indicator lights ON when the gen-lock signal (composite or black burst signal) for external synchronization is supplied to the Gen-lock Input Connector (6) or to the 10-Pin SEG Connector (4) via the production mixer WJ-S1E.

2. **Power Indicator (POWER)**

3. **DC Power Selection Switch (DC POWER)**
   Set this switch according to the DC power supplied to this unit.
   SEG : Set to this position if the production mixer WJ-S1E or the AC adaptor WV-PS03 is connected to the 10-pin SEG connector (4).
   EXT : Set to this position if the +12V DC is supplied to the 4-pin External DC Input Connector (5).

4. **10-pin SEG Connector (SEG)**
   This connector is used for connecting the 10-pin camera cable from the production mixer WJ-S1E or the AC adaptor WV-PS03 for system operation.

5. **4-Pin External DC Input Connector (EXT DC)**
   This connector is used for connecting a cable from an external DC nominal 12V (11V - 20V), 0.7A power source (a belt type battery or a car battery for example).



6. **Gen-lock Input Connector (GEN-LOCK)**
   The colour video signal of camera is automatically synchronized to the gen-lock signal (composite or black burst) which is introduced in this connector from the system reference such as a special effects generator.
   Caution : If the gen-lock signal contains much jitter (such as a VTR playback signal), the camera may not be synchronized properly.

7. **Video Output Connector (BNC) (VIDEO OUT)**
   A composite video signal is provided at this connector.

8. **Release Button**
   When removing the gen-lock adaptor, press this button.

9. **Horizontal Phase Control (H PHASE)**
   The horizontal phase of the camera signal is adjusted to match the horizontal phase of the signal at the Gen-lock Input Connector (6) or the 10-pin SEG connector (4).
   This control should be adjusted when the camera is used in a system using a special effects generator or the production mixer WJ-S1E

10. **Subcarrier Phase Fine Control (FINE)**
    This control allows fine adjustment of the subcarrier phase set by the Subcarrier Phase Coarse Switch (11).
    It allows continuous control of up to plus 90° subcarrier phase to match the phase of subcarrier signal at the Gen-lock Input Connector (6) or the 10-pin SEG connector (4).
    This control should be adjusted together with the Subcarrier Phase Coarse Switch (11) when the camera is used in the system using the special effects generator or the production mixer WJ-S1E.

11. **Subcarrier Phase Coarse Switch (SC PHASE)**
    The subcarrier phase of the camera signal is adjusted from 0° to 360° in 90° steps with these switches as shown below for matching the phase of subcarrier signal at the Gen-lock Input Connector (6) or the 10-pin SEG connector (4).
    The switches should be set when the camera is used in the system using the special effects generator or the production mixer WJ-S1E.

SC Phase	0°	90°	180°	270°
Position of Switches	■ 1 2 ■ 3 4	■ 1 2 3 ■ 4	1 ■ 2 3 ■ 4	1 ■ 2 ■ 3 4

CIRCUIT DESCRIPTION

1. Principle of CCD Color Solid State Video Camera

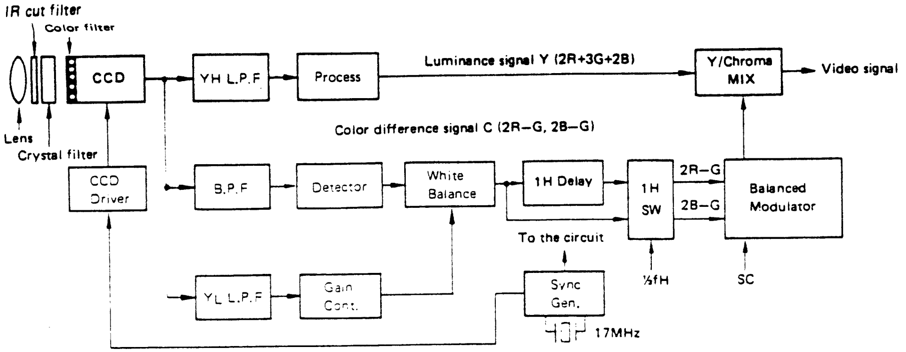

IR cut filter
Color filter
Lens
Crystal filter
CCD
YH L.P.F
Process
Luminance signal Y (2R+3G+2B)
Y/Chroma MIX
Video signal
Color difference signal C (2R−G, 2B−G)
CCD Driver
B.P.F
Detector
White Balance
1H Delay
1H SW
2R−G
2B−G
Balanced Modulator
To the circuit
½fH
SC
YL L.P.F
Gain Cont.
Sync Gen.
17MHz

Fig. 1-1 Block Diagram of Video Signal Processing Circuit

The incoming light passes through the auto-focus/auto-iris lens, the infrared (IR) cut filter, and the crystal filter to reach the surface of the CCD image sensor (MN3741F). The sensor incorporates an integrated color filter, much the same as a tube-type camera.

The CCD image sensor contains an array of photo-diodes (PD), each under it's own colored filter. As shown below, the photo-diodes are connected to vertical shift registers (VCCD), which are connected to a horizontal shift register (HCCD). The output is taken from the Floating Diffusion Amplifier (FDA).

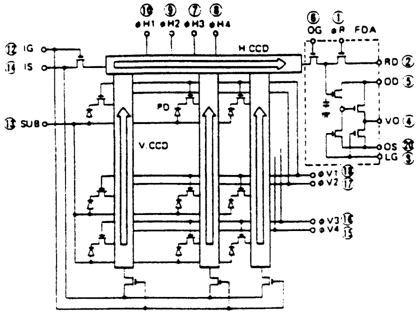

⑩ ⑨ ⑦ ⑥
øH1 øH2 øH3 øH4
⑧ ①
OG øR FDA
⑫ IG
⑭ IS
H CCD
RD ②
OD ③
⑬ SUB
PD
V CCD
VO ④
OS ⑯
LG ⑮
øV1 ⑪
øV2 ⑰
øV3 ⑱
øV4 ⑤

Fig. 1-2 Schematic Diagram of CCD image Sensor MN3741F

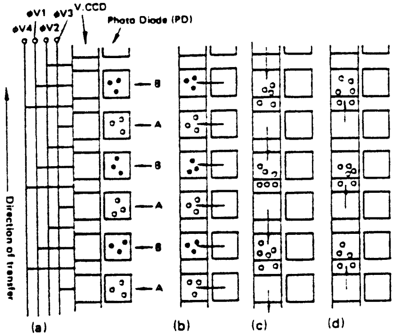

øV1 øV3
øV4 øV2
V.CCD
Photo Diode (PD)
Direction of transfer
B
A
B
A
B
A
(a)
(b)
(c)
(d)

Fig. 1-3 Readout Organization of Signal Charge "Field Integration Mode"

a) Charge storage in the photo-diodes
b) Charge transfer from PDs to VCCD
c) Mixing of charges in VCCD for field A
d) Mixing of charges in VCCD for field B

Figure 1-3 indicates the signal charge readout system. This system is called the "field integration" mode, whereby the outputs of a pair of PDs are mixed to produce a single charge packet.

First, each PD charges to a level which is dependent on the level of incident illumination. These charges are then shifted to the VCCD by vertical transfer pulses 1 and 3 (øV1 & øV3).

Next, pairs of charges are mixed to produce charge packets. Different pairs of charges are mixed for fields A and B.

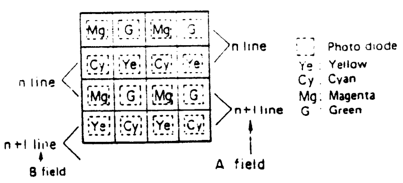

Mg G Mg G
Cy Ye Cy Ye
Mg G Mg G
Ye Cy Ye Cy
n line
n line
n+1 line
n+1 line
B field
A field
Photo diode
Ye : Yellow
Cy : Cyan
Mg : Magenta
G : Green

Fig. 1-4 New Color Filter Geometry

Figure 1-4 shows the layout of the color filter. The mixing scheme is shown for both fields as well. For example, to produce line 1 of field A, rows 1 & 2 are mixed.. Line 2 is produced by mixing rows 3 & 4, and so on. To produce the first line of field B however, rows 2 & 3 are mixed, followed by 4 & 5 for the next line, and so on.

The output signals from the CCD image sensor are as follows;

Complete signal, line N	$S_N = Y_N + C_N \sin(\omega c.t)$
Complete signal, line N + 1	$S_{N+1} = Y_{N+1} + C_{N+1} \sin(\omega c.t)$
Luminance component, line N	$Y_N = (Ye+G) + (Cy+Mg) = 2R + 3G + 2B$
Luminance component, line N + 1	$Y_{N+1} = (Ye+Mg) + (Cy+G) = 2R + 3G + 2B$
Chrominance component, line N	$C_N = (Cy+Mg) - (Ye+G) = 2B - G$
Chrominance component, line N + 1	$C_{N+1} = (Ye+Mg) - (Cy+G) = 2R - G$

As shown in figure 1-1, this output signal is routed in three different ways; through the Y_H low pass filter, the band pass filter, and the Y_L low pass filter. These will be explained in turn.

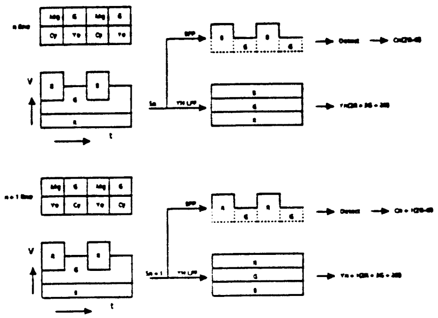

n line
n+1 line
Mg G Mg G
Cy Ye Cy Ye
Ye Cy Ye Cy
V
t
BPF
Detect
YH LPF

Fig. 1-5 Color Signal Separatioin (Field "A")

The luminance signal flows through the top path to the process circuit, to be mixed with the color signal and output from the camera.

The band pass filter passes only the modulated color difference signal as shown in figure 1-5. This signal is passed to the detector which develops the color difference signals (2R-G & 2B-G), which correspond to R-Y B-Y.

These signals are sent in serial form (2R-G/2B-G/2R-G/2B-G etc.) to the White Balance circuit for level matching.

The Y_L low pass filter feeds the Y_L signal to the gain control block for white balancing.

the sequential 2R-G 2B-G signal is then split. The signal is sent through a delay line, and directly, to a switch, which is switched at one-half the horizontal rate. This routing converts the sequential signal into two parallel color difference signals.

The color difference signals are then modulated, and mixed with the luminance signal, yielding the composite NTSC output signal.

The sync generator signals are used by the CCD driver board as well as the other camera circuits.

Infrared Cut Filter

As shown in Fig. 1-6 the CCD image sensor has sensitivity in infrared region beyond the visible range.

The infrared (IR) cut filter blocks the infrared light rays which the human eye does not see as light.

If the signal is made by using the infrared rays which the human eye can not normally see, picture on the monitor and that seen with the naked eye would differ substantially.

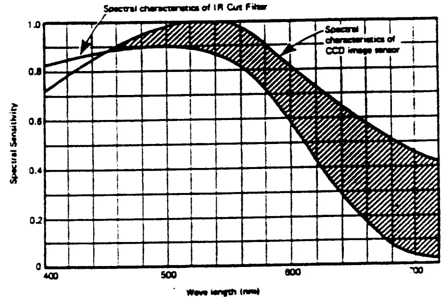


Fig. 1-6 IR Cut Filter Response

Crystal Filter

As described later, since the yellow, cyan, green and magenta images are modulated by the fine mosaic filter built into the CCD image sensor, a false signal could develop due to interference between the fine mosaic filters and fine detail objects. The crystal filter is an optical low pass filter which prevents the occurrence of such false signals by blocking the high frequency components of images.

2. CCD Board

o CCD Head Circuit

This board receives CCD drive pulses and feeds them to the CCD image sensor IC1. The prevideo signal from IC1 is sent from pin 4 through buffer Q5 to Sample/Hold IC6 pin 2 on the CCD drive board.

The Horizontal transfer pulses øH1 and øH3 from the Drive Pulse circuit are fed to pins 4 and 2 of inverter IC2 (a) and (b) respectively. The outputs are sent to pins 10 and 7 of CCD IC1. Pulses øH2 and øH4 are developed from øH1 and øH3 by adding a DC offset to each by diode pair D2. These pulses are fed to IC1 pins 9 and 8.

Vertical transfer pulses øV1, øV2, øV3 and øV4 are supplied to pins 18, 17, 16 and 15 of IC1 respectively.

The reset pulse (øR) from the Drive Puse circuit is supplied to IC1 pin 1 through inverters Q1/Q2, amplifiers Q3/Q4, and diode D1.

CCD Image Sensor

The CCD image sensor used in the single-chip camera has a color separating system using the field integration operation mode which has superior characteristics, such as no field time lag and less false signal.

Furthermore a newly developed color filter array consisting of four colors, yellow, cyan, green and magenta gives a large luminance signal and a deep modulated color signal by adopting a line sequential color differential method.

The CCD image sensor MN3741F has 333494 picture elements (vertical (V) 581 x horizontal (H) 574). Its image size is 6.61(V) x 8.81(H)mm² so that a 2/3-inch optics and lens can be used. The CCD image sensor is mounted on dual in line package with 20 pins and has a optical window in front of the cell as shown in Fig. 2-1.

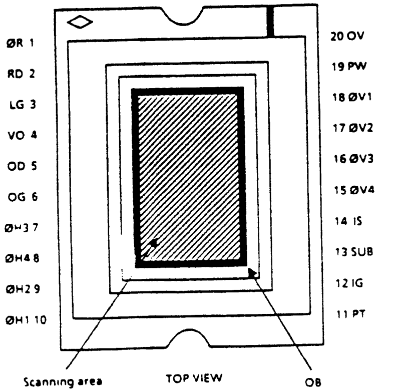


Fig. 2-1 Appearance of CCD Image Sensor

Items	Value	Unit
Chip Size	8.60(V) x 9.76(H)	mm²
Cell Size	11.39(V) x 15.35(H)	µm²
Image Size	6.61(V) x 8.81(H)	mm²
Number of elements	581(V) x 574(H) (Excluding O.B)	pcs

		Operating Condition		
		Max.	Standard	Min.
VRD (V)		16.8	16.0	15.2
VOD (V)		16.8	16.0	15.2
VLG (V)		3.5	3.0	2.5
VOG (V)		10.0	Adjust	0
VIG (V)		—	0	—
VOS (V)		—	0	—
VPT (V)		−7.8	−8	−8.2
VPW (V)		—	0	—
VIS (V)		16.8	16.0	15.2
VSub (V)		16.0	Adjust	3.0
VøR	H(V)	15.5	15.0	14.5
	L(V)	3.5	3.0	2.5
VøH1	H(V)	8.5	8.0	7.5
	L(V)	0.3	0	0
VøH2	H(V)	12.5	12.0	11.7
	L(V)	4.5	4.0	3.7
VøH3	H(V)	8.5	8.0	7.5
	L(V)	0.3	0	0
VøH4	H(V)	12.5	12.0	11.7
	L(V)	4.5	4.0	3.7
VøV2	M(V)	3.2	3.0	2.8
	L(V)	−6.7	−7.0	−7.3
VøV1	H(V)	15	Adjust	12.5
	M(V)	3.2	Adjust	2.8
	L(V)	−5.7	−6.0	−6.3
VøV4	M(V)	3.2	3.0	2.8
	L(V)	−6.7	−7.0	−7.3
VøV3	H(V)	15	Adjust	12.5
	M(V)	3.2	Adjust	2.8
	L(V)	−5.7	−6.0	−6.3

Table 1 Specification of CCD Image Sensor MN3741F

The pin identification of CCD image sensor MN3741F is as follows;

Pin No.	Pin Name	Description
1	øR	Reset Pulse
2	RD	Reset Drain
3	LG	Gate of Output Load Transistor
4	VO	Video Output
5	OD	Output Drain
6	OG	Output Gate
7	øH3	H Transfer Pulse 3
8	øH4	H Transfer Pulse 4
9	øH2	H Transfer Pulse 2
10	øH1	H Transfer Pulse 1
11	PT	Protection for P-Well
12	IG	H CCD Input Gate
13	SUB	Substrate
14	IS	V CCD Input Source
15	øV4	V Transfer Pulse 4
16	øV3	V Transfer Pulse 3
17	øV2	V Transfer Pulse 2
18	øV1	V Transfer Pulse 1
19	PW	P-Well
20	OS	Output Source

• Types of CCD Image Sensors

(1) Interline Transfer System

Accumulated charge packets on the independent sensor (Photo Diode) are transferred to the vertical shift register (V-CCD) all at once in every vertical blanking period (1/50 sec). They are then shifted one-step down to the horizontal shift register (H-CCD) in every horizontal blanking period. The charge packets in H-CCD are transferred to the left by turns, and taken out as the output signal.

(2) Frame Transfer System

The sensitive section and accumulator section are separated as shown. Accumulated charge packets in the sensitive section are transferred to the accumulator section in parallel, all at once, in every other vertical blanking period (1/25 sec).

They are then shifted down to the H-CCD in every horizontal blanking period inside the accumulator section. The charge packets inside the H-CCD are transferred to the output during the active (picture) period of each horizontal line. In addition, to obtain the 2:1 interlace effect, the voltages supplied to the CCD element are switched each field and the another set of photo diodes is used (Odd Field — PDs 2 and 4. Even Field — PDs 1 and 3.)

Constitution and Outline of Transfer of CCD Image Sensor

CCD image sensor is made up of a simple MOS structure and consists of;

(1)	Photo diode (PD) ——	Generates charge packets corresponding to the incoming light intensity.
(2)	V-CCD ——	Accumulates the charge packets from PD and transfers them in the vertical direction.
(3)	H-CCD ——	Transfers charge packets in the horizontal direction to the output.
(4)	Output Section ——	Outputs the signal transferred from the H-CCD sequentially.

The block diagram of the CCD image sensor is shown below. Each pixel corresponds to one photo diode.

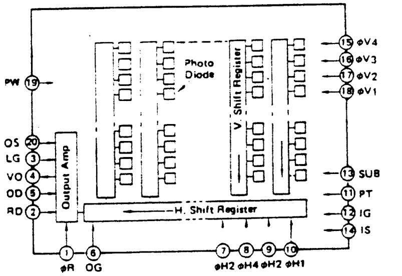


Fig. 2-2 Block Diagram of CCD Image Sensor

Transferring the charge packets down in the V-CCD corresponds to vertical deflection and transferring the signalcharges from the V-CCD to the left, in H-CCD corresponds to horizontal deflection.

In the next section, the transfer is described in sequence.

Let's study it by referring to the timing of the composite video output (VBS) signal.

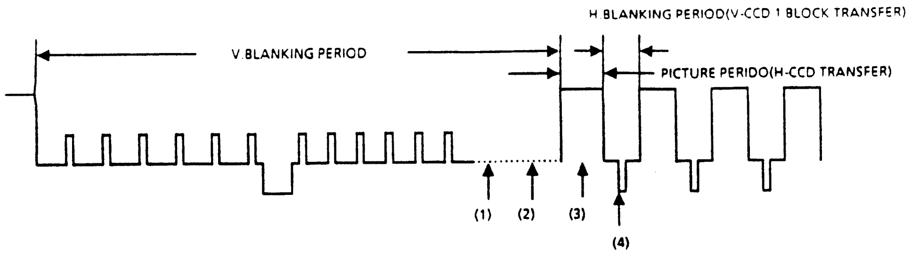

H BLANKING PERIOD(V-CCD 1 BLOCK TRANSFER)
V BLANKING PERIOD
PICTURE PERIDO(H-CCD TRANSFER)
(1)
(2)
(3)
(4)

Fig. 2-3 Timing Chart of Transfer

① At first, all accumulated charge packets in all photo diodes are read out into the V-CCD ((1), (2)).

② The charge packets in the V-CCD are transferred one-step down (it is more complicate in actuality). By this action, the charge packets of one horizontal line are transferred to the H-CCD ((4)).

③ The charge packets in the H-CCD are transferred to the left in order and the video signal for that line is output during the horizontal scanning period (horizontal picture period) ((3)).

④ After completing the transfer from right to left, the next row of charge packets in the V-CCD are transferred into the H-CCD in the next horizontal blanking period.

⑤ By repeating ② ~ ④, charge packets for 1V period (312.5 lines) have been transferred (No. 1 field has been completed.).
After that, the steps beginning at ① are repeated for the No. 2 field scanning.

As a result, the readout of the charge packets from the PDs is done every 1V period (1/50 sec.). A by-product of this system is a flicker effect when fast moving objects are scanned.

Summary of CCD Transfer

The CCD (Charge Coupled Device) consists of a MOS capacitor as a unit element. Thousands of these elements are placed in an array, and each has the following functions;

1. Accumulation of charges
2. Transfer of charge packets

Accumulation of Charges

On the P-type silicon substrate, the gate electrodes are laid out independently on top of the substrate and oxidized film is inserted between the substrate and gate electrodes. Let's study the case of adding bias to each electrode (Fig. 2-4).

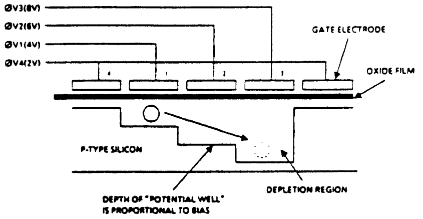


Fig. 2-4

(1) The voltage applied to each gate reverse biases the P-type semiconductor substrate so that the "holes" are pressed downward. This creates a depletion region under the electrode.

(2) Near the gate electrode, the substrate has no "holes", i.e. a "potential well" appears. The depth of this potential well is proportional to the bias. There are no holes in the potential well., so that if electrons (charges) are introduced into the potential well, they w[illegible] remain there.
T[illegible]s called accumulation of charges.

(3) As shown in Fig. 2-4, electrons under electrode 1 will not remain there if the potential wells under electrodes 2 and 3 assume the stairstep levels indicated, due to the higher positive voltages present on the electrodes, but will migrate to the right.

Transfer of charge packets

(1) As shown in Fig.. 2-5, when the electrode voltages are applied as shown, the charge under 3 will move to 1 since the bias of øV1 is the highest. (#1 potential well is deepest.)

(2) In this way, charge packets can be moved freely by changing the bias of the gates in an orderly fashion.
This is called transfer of charge packets.

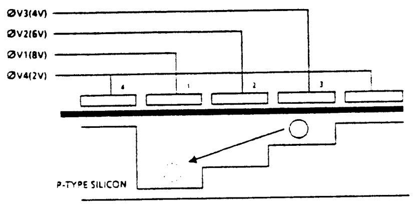


Fig. 2-5

Read Out from the Photo Diode (PD) to V-CCD

Structure of V-CCD and Outline of Transfer

(1) Photo diodes which convert the incoming light energy in to charges are connected to the number 1 and 3 sections of the V-CCD through the gate FETs.
The gate FETs turn ON during the read out period and turn OFF during the transfer period.

2) The read out function is performed during a 2H period in every vertical blanking period (1/50 sec) and the charges generated by the PDs are transferred to V-CCD all at once. (See timing diagram shown in Fig. 2-6.)

(3) After completing the read out, the charge packets in the V-CCD are transferred to the H-CCD during each horizontal blanking period.
One transfer function consists of four sections/transfer since one block of V-CCD consists of 4 sections.

Order of function

First, remember that the read out from the PDs to the V-CCD and the transfer within the V-CCD are performed by the pulse timing of øV1 ~ øV4.

1) The photo diode charges are read out into the number 1 and 3 sections of the V-CCD by supplying the HIGH level of bias to øV1 and øV3 during the vertical blanking period.

2) After completing the read out, the charge packets in the number 1 and 3 sections inside the V-CCD are mixed i.e., one pixel consists of the mixture of the number 1 and 3 sections of the V-CCD.

(3) The mixed charge packets are then transferred to the H-CCD in turn during the horizontal blanking period.

A detailed explanation of the read out and transfer in the V-CCD follows next.

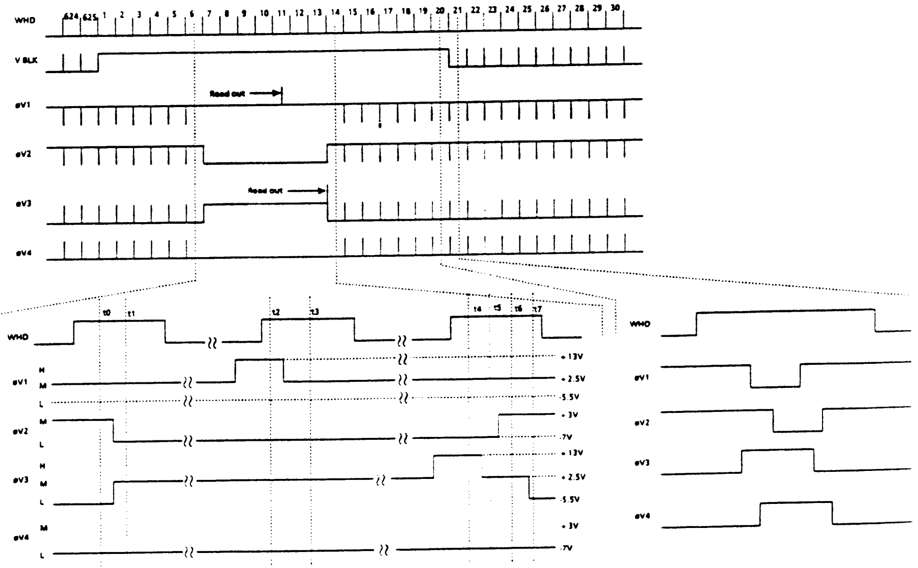


Fig. 2-6 Timing Chart

Function of H-CCD Transfer

(1) **t = t1 —(øH2 > øH1 > øH4 > øH3)(Fig.2-8-1)**
Charge packets from the V-CCD are dumped into the number 2 sections of horizontal CCD (H-CCD) and the potential of the number 2 sections are the lowest.

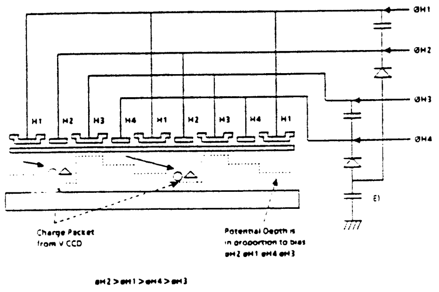

øH1
øH2
øH3
øH4
H1
H2
H3
H4
H1
H2
H3
H4
H1
(E)
Charge Packet from V CCD
Potential Depth is in proportion to bias øH2 øH1 øH4 øH3
øH2 > øH1 > øH4 > øH3

Fig. 2-8-1

(2) t = t2 —(øH4 > øH3 > øH2 > øH1)(Fig.2-8-2)
The potential of the number 4 sections of H-CCD become the lowest so that the charge packets in the number 2 sections move to the number 4 sections.

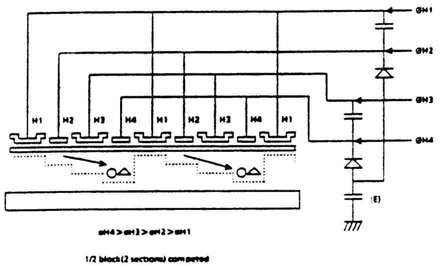

øH1
øH2
øH3
øH4
H1
H2
H3
H4
H1
H2
H3
H4
H1
(E)
øH4 > øH3 > øH2 > øH1
1/2 block(2 sections) completed

Fig 2-8-2

(3) t = t3 —(øH2 > øH1 > øH4 > øH3)(Fig.2-8-3)
The potential of the number 2 sections of H-CCD become the lowest so that the charge packets in the number 4 sections move to the number 2 sections.

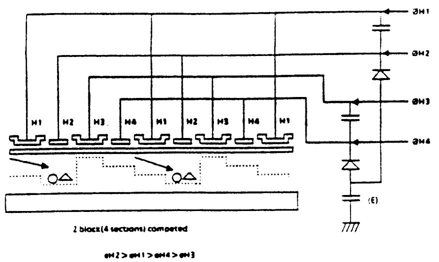

øH1
øH2
øH3
øH4
H1
H2
H3
H4
H1
H2
H3
H4
H1
(E)
2 block(4 sections) completed
øH2 > øH1 > øH4 > øH3

Fig. 2-8-3

(4) t = t4 —(øH4 > øH3 > øH2 > øH1)(Fig.2-8-4)
The potential of the number 4 sections of H-CCD become the lowest so that the charge packets in the number 2 sections move to the number 4 sections.

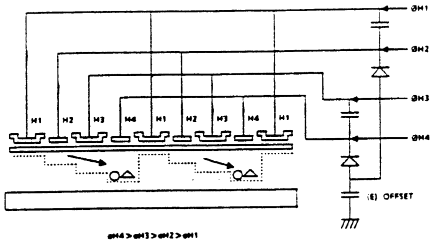
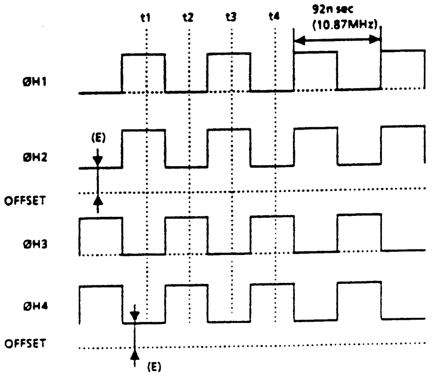

øH1
øH2
øH3
øH4
H1
H2
H3
H4
H1
H2
H3
H4
H1
(E) OFFSET
øH4 > øH3 > øH2 > øH1

Fig. 2-8-4

(1) ~ (2) show 1 cycle of the horizontal transfer for 1 pixel. (Time is 92 nsec, 10.87 MHz).


t1
t2
t3
t4
92n sec
(10.87MHz)
ØH1
ØH2
(E)
OFFSET
ØH3
ØH4
OFFSET
(E)

øH1 - øH4 TRANSFER PULSE

Fig. 2-8-5

3. CCD Drive Board

3-1 CCD Drive Pulse Generator Circuit

This circuit receives vertical scanning start pulse (Vp), wide horizontal drive pulse (WHD) and blanking pulse (BLK) from the sync generator circuit in the Sync/Power board and clock pulse from pulse generator IC3, and generates CCD drive pulses and other pulses.
The pin identification of CCD drive pulse generator IC1 is as follows;

Pin No.	Pin Name	In/Out	Description
1	øV1	Out	V Transfer Pulse 1
2	øV2	Out	V Transfer Pulse 2
3	øV3	Out	V Transfer Pulse 3
4	øV4	Out	V Transfer Pulse 4
5	PT1	Out	Photo Diode Transfer Pulse 1
6	PT3	Out	Photo Diode Transfer Pulse 3
7	T1	—	Not Used
8	T3	—	Not Used
9	REN	—	Not Used
10	FNV2	—	Not Used
11	FPV2	—	Not Used
12	TC	—	Not Used
13	FNT4	Out	Vertical Pulse
14	HTG	—	Not Used
15	CPBL	—	Not Used
16	NO	—	Not Used
17	V_{DD}	In	Power
18	CLR	In	Clear
19	F	—	Not Used
20	VPEN	—	Not Used
21	MODE	In	Mode Select
22	PNSW	In	PAL/NTSC select
23	WHD	In	Wide Horizontal Drive Pulse
24	VP	In	Vertical Scanning Start Pulse
25	BLK	In	Blanking Pulse
26	FH2N	Out	1/2fH Pulse
27	FH2P	Out	1/2fH Pulse
28	FH2MF	—	Not Used
29	FH2PP	—	Not Used
30	A5M	Out	5MHz (0°)
31	B5M	—	Not Used
32	C5M	Out	5MHz (180°)
33	D5M	Out	5MHz (270°)
34	CP3	—	Not Used
35	CP3V	Out	Clamp Pulse 3 (Stopped V blanking period)
36	CP4	—	Not Used
37	CP5	Out	Clamp Pulse 5
38	BGP	—	Not Used
39	V_{SS}	—	Ground
40	TECK	—	Ground
41	CLK	In	Clock Pulse
42	HCBL	Out	Horizontal Blanking Pulse
43	PCAO	Out	Phase Comparator Out
44	PCBO	Out	Phase Comparator Out

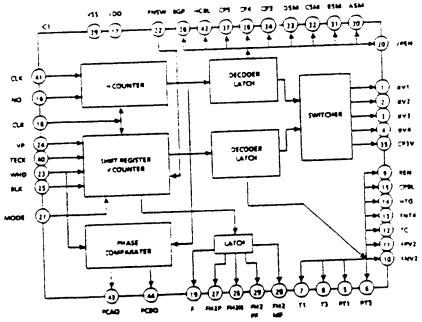

VSS
VDD
PNSW
BGP
HCBL
CP5
CP4
CP3
D5M
C5M
B5M
A5M
VPEN
CLK
NO
CLR
VP
TECK
WHD
BLK
MODE
COUNTER
DECODER LATCH
SWITCHER
SHIFT REGISTER COUNTER
DECODER LATCH
PHASE COMPARATOR
LATCH
øV1
øV2
øV3
øV4
CP3V
REN
CPBL
HTG
FNT4
TC
FPV2
FNV2
PCAO
PCBO
F
FH2P
FH2N
FH2MF
FH2PP
T1
T3
PT1
PT3

Fig. 3-1 Block Diagram of IC1

The vertical (V) transfer pulses 1 (øV1) and 3 (øV3) from pins 1 and 3 of IC1 are supplied to pins 13 and 8 of pulse amplifier IC2 and are amplified respectively. The photo diode transfer pulses 1 (PT1) and 3 (PT3) from pins 5 and 6 of IC1 are supplied to pins 12 and 9 of IC2 and mixed with amplified V transfer pulses 1 and 3 inside IC2 respectively. The +3V DC adjusted by VR5 (øV_M) is fed from the emitter of Q5 pins 3 and 19 of IC2 for the middle level of øV1 and øV3
The øV_H voltage adjusted by VR4 (øV_H) is fed to pin 16 of IC2 from the emitter of Q4.
The V transfer pulses 1 (øV1) and 3 (øV3) obtained at pins 18 and 5 of IC2 are fed to pins 18 and 16 of CCD image sensor IC1 in the CCD board.

The pin identification of pulse amplifier IC2 is as follows.

Pin No.	Name	In/Out	Descriptions
1	Vss	In	Low Bias
2	B01	Out	øV2 Pulse
3	V_{DD2a}	In	Middle Bias
4	NC	—	Not Used
5	T01	Out	øV3 Pulse
6	Vcc	—	Power
7	NC	—	Not Used
8	TI1	In	V Transfer Pulse 3
9	PG1 (PT3)	In	Photo Diode Transfer Pulse 3
10	BI1	In	V Transfer Pulse 2
11	BI2	In	V Transfer Pulse 4
12	PG2 (PT1)	In	Photo Diode Transfer Pulse 1
13	TI2	In	V Transfer Pulse 1
14	NC	—	Not Used
15	GND	—	Ground
16	V_{DD1}	In	High Bias
17	NC	—	Not Used
18	T02	Out	øV1 Pulse
19	V_{DD2b}	In	Middle Bias
20	B02	Out	øV4 Pulse

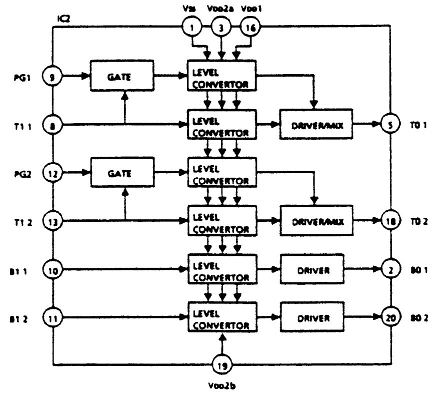

IC2
Vss Vdd2a Vdd1
1
3
16
PG1
9
GATE
LEVEL CONVERTOR
T11
8
LEVEL CONVERTOR
DRIVER/MIX
5
T01
PG2
12
GATE
LEVEL CONVERTOR
T12
13
LEVEL CONVERTOR
DRIVER/MIX
18
T02
B11
10
LEVEL CONVERTOR
DRIVER
2
B01
B12
11
LEVEL CONVERTOR
DRIVER
20
B02
19
Vdd2b

Fig. 3-2 Block Diagram of IC2

Q2 supplies -7V DC to pin 1 of IC2 for the low level of øV2 and øV4.

Q10 supplies -4.7V DC to D5 for the low level of øV1 and øV3.

The vertical (V) transfer pulses 2 (øV2) and 4 (øV4) from pins 2 and 4 of IC1 are supplied to amplifier Q1/Q3 and Q2/Q4 in the CCD drive sub board. The amplified pulses 2 (øV2) and 4 (øV4) obtained at pins D and E of the CCD drive sub board are fed to pins 17 and 15 of CCD image sensor IC1 respectively.

The pin identification of horizontal transfer pulse generator IC3 is as follows;

Pin No.	Pin Name	In/Out	Description
1	CLK	Out	Clock Pulse (10.8MHz)
2	OSC	In	OSC (21.7MHz)
3	OSC	In	OSC (21.7MHz)
4	SP1	Out	Sample Pulse 1
5	SP2	—	Not Used
6	SP3	—	Not Used
7	SP4	Out	Sample Pulse 4
8	AI	In	A ch input
9	BI	In	B ch input
10	V_{SS}	—	Ground
11	MBO	Out	Reset Pulse (SP4)
12	AO	Out	Clamp Pulse (SP1)
13	HCBLK	Out	Horizontal Blanking Pulse
14	DH12	—	Not Used
15	H12	Out	Horizontal Transfer Pulse 1
16	DH34	—	Not Used
17	H34	Out	Horizontal Transfer Pulse 3
18	HCBLK	In	Horizontal Blanking Pulse
19	CLR	In	Clear
20	VDD	In	Power

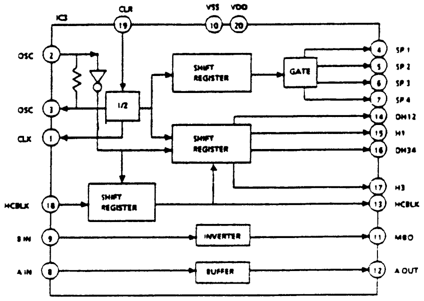
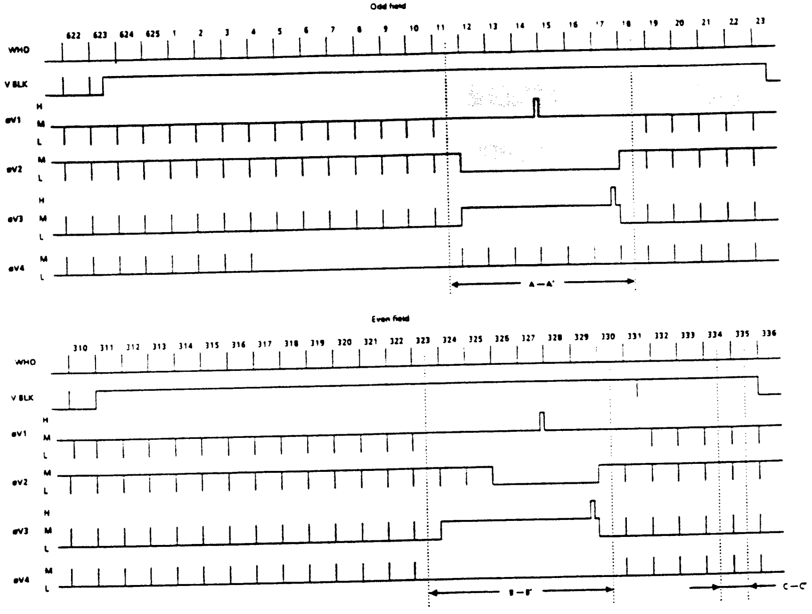
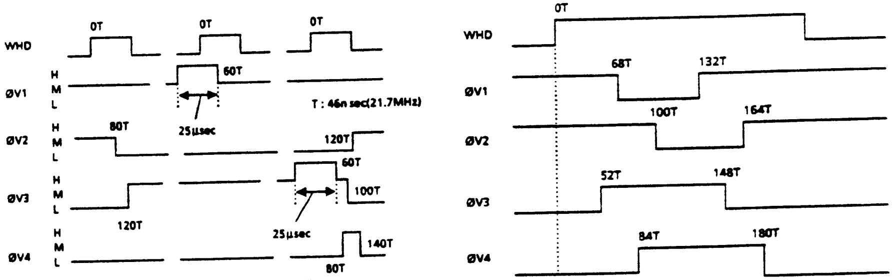

IC3
CLR
19
VSS VDD
10
20
OSC
2
OSC
3
CLK
1
1/2
SHIFT REGISTER
GATE
SHIFT REGISTER
SHIFT REGISTER
HCBLK
18
B IN
9
INVERTER
A IN
8
BUFFER
4 SP1
5 SP2
6 SP3
7 SP4
14 DH12
15 H1
16 DH34
17 H3
13 HCBLK
11 MBO
12 A OUT

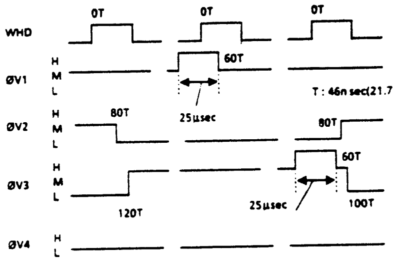
Fig. 3-3 Block Diagram of IC3


Odd field
622 623 624 625 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
WHD
V BLK
øV1
øV2
øV3
øV4
H
M
L
A—A'
Even field
310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336
B—B'
C—C'


WHD
øV1
øV2
øV3
øV4
H
M
L
0T
60T
25µsec
T : 46n sec(21.7MHz)
80T
120T
60T
100T
120T
25µsec
140T
80T
0T
68T
132T
100T
164T
52T
148T
84T
180T

Odd field Readout Pulse (A — A')

V.Transfer Pulse (C — C')


WHD
øV1
øV2
øV3
øV4
H
M
L
0T
60T
T : 46n sec(21.7MHz,
80T
25µsec
80T
60T
120T
25µsec
100T

Even field Readout Pulse (B — B')

Fig. 3-4 Timing Chart of V.Transfer Pulses

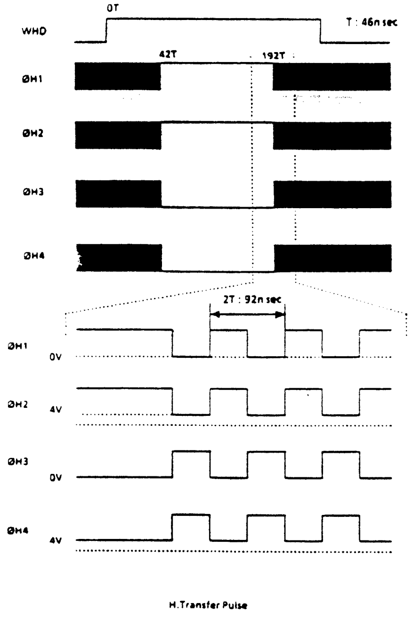


Fig. 3-5 Timing Chart of H.Transfer Pulses

The horizontal (H) transfer pulse generator IC3 generates H transfer pulses 1 and 3, sample pulse SP1 and SP4, clamp pulse and reset pulse respectively. The VCO bias is supplied from CCD drive pulse generator IC1 pins 43, 44 to VCO circuit (21MHz) consisting of D2, D3, C24, C25 and L7. The horizontal blanking pulse is supplied from pin 42 of IC1 to pin 18 of IC3

- o The clc [illegible]se (10.8MHz) obtained at pin 1 of IC3 is fed to pin 4[illegible]C1 and pin 5 of spot compensator IC4 in the sample hold circuit.
- o The horizontal (H) transfer pulse 1 (øH1) and H transfer pulse 3 (øH3) obtained at pins 15 and 17 of IC3 are fed to the CCD head circuit in the CCD board.
- o The sample pulse 4 (SP4) obtained at pin 7 of IC3 is fed to the sample hold circuit.
- o The clamp pulse (CP) obtained at pin 12 of IC3 is fed to the sample hold circuit.
- o The horizontal blanking (H BLK) pulse obtained at pin 13 of IC3 is fed to the spot compensator circuit.
- o The reset pulse (MBO) obtained pin 11 of IC3 is fed to the CCD head circuit in the CCD board.

Strobe Effect Shutter (SES) Mode

General Description

Normally the photodiodes accumulate a charge during the active picture period (1/50 sec.), and are read out as previously described. In the SES mode however, two readouts occur, one near the beginning and one near the end of V. blanking. The first set of charges are shifted to ground which may be thought of as resetting the photodiodes. The diodes then accumulate a new charge until the second readout occurs approximately 1 millisecond later.
this second group of charges are used to develop the video signal. Since the accumulation time is so short, there is virtually no blurring of fast moving scenes.

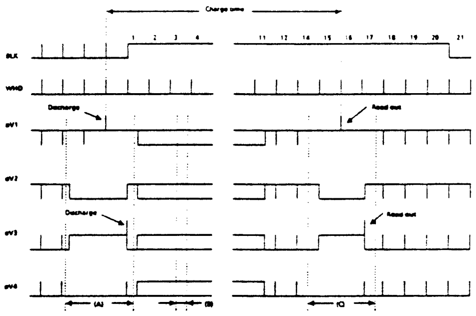


Fig. 3-6 Timing Chart for S.E.S Mode

Please refer to the schematic and the following figures.
When SW1 (STROBE EFFECT SHUTTER/NORMAL SELECTION SWITCH) on the Microprocessor board is set to the SES position, the high level from the Microprocessor board is supplied to pin 21 of CCD drive pulse generator IC1 through pin 19 of CN1. The photo diode transfer pulses 1 and 3 and vertical transfer pulses 1, 2, 3 and 4 are generated in the strobe effect shutter mode and fed to CCD image sensor IC1 in the CCD board through pulse amplifier IC2 and the CCD drive sub board.

(1) Read out for discharge. (Fig. 3-7)

a. When øV1 is high (H) bias, the signal charge is first transferred to number 1 of V.CCD from the photo diodes.
b. The signal charge is stored number 1 of V.CCD.
c. When øV3 is H bias, the signal charge is next t transferred to number 3 of V.CCD from the photo diodes.
d. The signal charge is stored in number 3 of V.CCD.
e. The signal charge in number 1 and 3 are mixed.

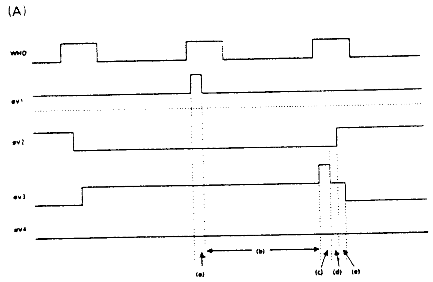


Fig. 3-7 Detail of Duration (A) of Fig. 3-6

(2) Transfer for discharge (Fig. 3-8, 3-9)

f. The mixed signal charge is reversely shifted in the V.CCD and the mixed signal charge is fed to ground.

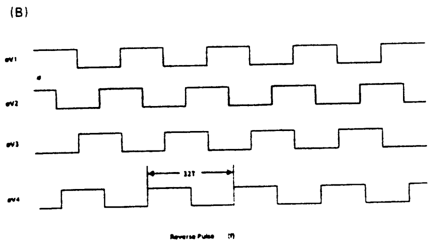


Fig. 3-8 Detail of Duration (B) of Fig. 3-6

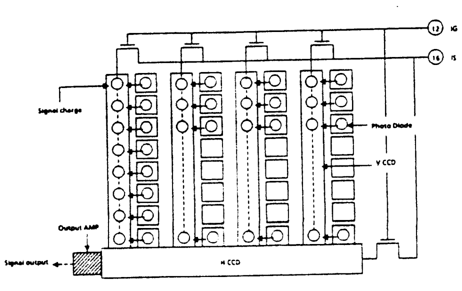


Fig. 3-9 Transfer for Discharge

(3) Read out for picture (Fig. 3-10)

g. When next øV1 is H bias, the signal charge (17H period) is transferred number 1 of V.CCD from the photo diodes.
h. The signal charge is stored number 1 of V.CCD.
i. When next øV3 is H bias, the signal charge (17H period) is transferred number 3 of V.CCD from the photo diodes.
j. The signal charge is stored in number 3 of V.CCD.
k. The signal charge in number 1 and 3 are mixed.
l. The mixed signal charge is shifted to V.CCD.

The mixed signal charge is transferred to the H.CCD from the V.CCD and the mixed signal charge obtained at output pin 4 of the CCD image sensor IC1.
The output video signal is sent to the 10 pin VTR connector and CN14 (32 pin) connector on the Mother board.

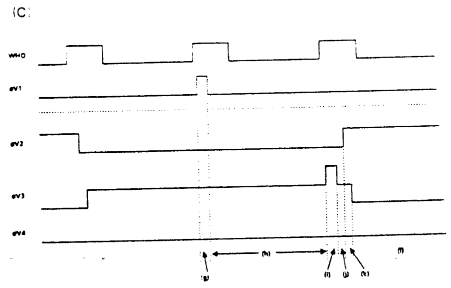


Fig. 3-10 Detail of Duration (C) of Fig. 3-6

3-2 Sample Hold Circuit

This circuit receives the modulated prevideo signal from the CCD image sensor IC1 on the CCD board and eliminates reset pulses and noise compensate spots/blemish and generates a video signal.
The CCD output signal obtained at pin 4 of IC1 on the CCD board is supplied to pin 2 of sample hold IC6 through buffer Q5.
This signal is fed to the clamp circuit inside IC6 by clamp pulse (CP) which is supplied to pin 3.
The clamped signal is then sent to the sample hold circuit inside IC6 where the signal components are sampled by the sample pulse 3 (SP3) sent through pin 6 of IC6.
The sampled/detected signal is sent to the spot (blemish) compensation (correction) circuit which is consisted of two spot correction circuits since the same color signals come every other pixels.

This compensated signal is detected every other pixels by sampling them at each sample hold circuit inside IC6 where receives SP1 and SP2 from pins 19 and 14 of IC6 and the detected signals are held as sample signal.

The detected signals are then fed to the mix circuit inside IC6. The mixed signal which is sampled again by SP3 and fed to a differential amplifier to eliminate the noise component and obtained at pin 12 of IC6 is fed to the Process board.

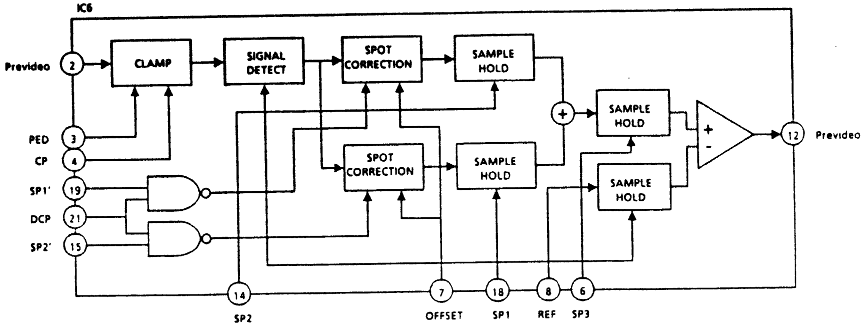

IC6
Prevideo
2
CLAMP
SIGNAL DETECT
SPOT CORRECTION
SAMPLE HOLD
SPOT CORRECTION
SAMPLE HOLD
SAMPLE HOLD
SAMPLE HOLD
+
-
12
Prevideo
PED
3
CP
4
SP1'
19
DCP
21
SP2'
15
14
SP2
7
OFFSET
18
SP1
8
REF
6
SP3

Fig. 3-11 Sample Hold Circuit

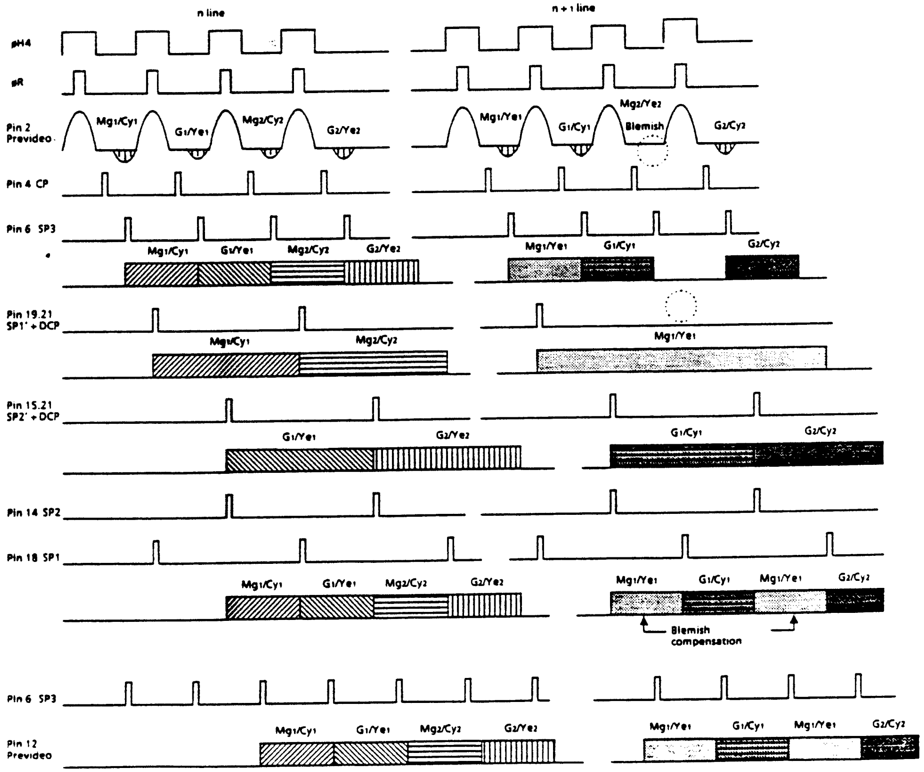

n line
n+1 line
øH4
øR
Pin 2 Prevideo
Mg1/Cy1
G1/Ye1
Mg2/Cy2
G2/Ye2
Mg1/Ye1
G1/Cy1
Mg2/Ye2
Blemish
G2/Cy2
Pin 4 CP
Pin 6 SP3
Pin 19.21 SP1'+DCP
Pin 15.21 SP2'+DCP
Pin 14 SP2
Pin 18 SP1
Blemish compensation
Pin 6 SP3
Pin 12 Prevideo

Fig. 3-12 Waveform of Sample Hold and Spot/Blemish Compensation

The pin identification of sample hold IC6 is as follows.

Pin No.	Name	In/Out	Descriptions
1	GND1	—	Ground
2	SIG	In	Prevideo
3	CLAMPDC	In	Clamp DC
4	CP	In	Clamp Pulse
5	V_{CC1}	—	Power
6	SP3 (SP4)	In	Sample Pulse 4
7	OFFSET	In	Offset Control
8	REF	—	Not Used
9	V_{CC2}	—	Power
10	GAIN CONT	—	Not Used
11	GND2	—	Ground
12	SIG	Out	Prevideo
13	V_{CC3}	—	Power
14	SP2	In	Sample Pulse 2
15	SP2'	In	Sample Pulse 2
16	GND3	—	Ground
17	GND4	—	Ground
18	SP1	In	Sample Pulse 1
19	SP1'	In	Sample Pulse 1
20	V_{CC4}	—	Power
21	DCP (B out)	In	Spot Correction Pulse
22	GND5	—	Ground
23	V_{CC5}	—	Power
24	CDS	—	Not Used

+5V DC is generated by IC7 which is used to power IC6.

The clamp pulse is supplied from the CCD drive pulse generator circuit to pin 2 of AND gate IC5 (a) and generates the sample hold pulse 2. It is sent to pins 14 and 15 of IC6.

Also the clamp pulse is supplied to pin 4 of another AND gate IC5 (b) and generates the sample hold pulse 1. It is sent to pins 18 and 19 of IC6.

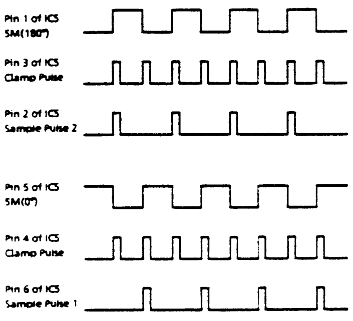

Pin 1 of IC5
SM(180°)
Pin 3 of IC5
Clamp Pulse
Pin 2 of IC5
Sample Pulse 2
Pin 5 of IC5
SM(0°)
Pin 4 of IC5
Clamp Pulse
Pin 6 of IC5
Sample Pulse 1

Fig. 3-13 Sample Pulse 1 and 2 Generation

IC4 is a ROM IC used for the compensation of spots or blemishes on the CCD image sensor. The position of spots/blemishes is memorized in the IC4 and this information is sent to IC6. In IC6, the sample pulse 1 (SP1) and the sample pulse 2 (SP2) which coincide with the position of the spots/blemishes are not generated. Therefore, the spots/blemishes are skipped from the sampling, i.e., they are not detected and not displayed. Since the sample pulses are inhibited for the duration of the spot, the value of the previous pixel is held by IC6, and therefore substituted.

Note : IC4 does not comes with the CCD image sensor which has no spots or blemishes.

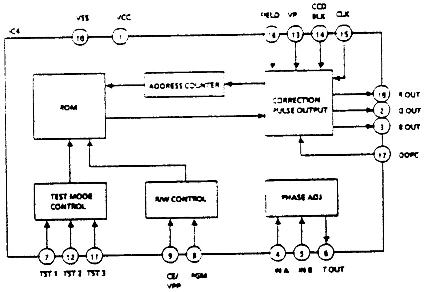

IC4
VSS
VCC
FIELD
VP
CCD BLK
CLK
10
1
16
13
14
15
ADDRESS COUNTER
ROM
CORRECTION PULSE OUTPUT
18
R OUT
2
G OUT
3
B OUT
17
DOPC
TEST MODE CONTROL
R/W CONTROL
PHASE ADJ
7
12
11
TST 1
TST 2
TST 3
9
8
CE/VPP
PGM
4
5
6
IN A
IN B
T OUT

Fig. 3-14 Block Diagram of IC4

3-3 CCD Bias Circuit

This circuit controls the power source of the CCD image sensor.

o The horizontal transfer pulse DC (+8V) is generated by Q7 and Q8 and fed to the CCD board.

o +12V DC is generated by Q6 and it is used as the power source for the reset pulse generator circuit Q1, Q2, Q3 and Q4 in the CCD board.

o VR1 (CCD BIAS) and Q3 are controls for setting the CCD bias (V sub).

o VR4 (øVH) and Q4 are controls for setting the high level of the vertical transfer pulses øV1 and øV3.

o VR5 (øVM) and Q5 are controls for setting the middle level of the vertical transfer pulses øV1 and øV3.

4. Power/Sync Board

4-1 + 8.6V(AF)/ + 4.9V/ + 5V Regulator Circuit

This circuit generates the regulated + 8.6V DC, + 4.9V DC and + 5V DC from + 12V unregulated DC power from the power supply unit.

o + 4.9V Regulator Circuit

The reference DC voltage supplied to pin 4 of IC8 whose level is set by VR3 (+ 4.9V ADJ) and + 4.9V output DC supplied to pin 5 of IC8 are compared by the error amplifier inside IC8.
The error output DC voltage corresponding to the + 4.9V DC voltage error and triangular signal supplied from triangle OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage appears at pin 7 of IC8.
The switching pulse is applied to the base of switching transistor Q12 switching it ON and OFF.
As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of the switching regulator circuit consisting of Q12, D16 and L12. The generated DC voltage is fed back to pin 5 of IC8 to maintain a constant output voltage.
The regulated + 4.9V is then supplied to the other circuits through the filter consisting of L14 and C67.
The vertical start pulse is supplied from the sync generator IC3 to pin 13 of IC8 through buffer Q14 to control the triangle OSC circuit, to prevent interference (Beating) with the video signal.

o + 8.6V (AF) Regulator Circuit

The reference DC voltage supplied to pin 11 of IC8 and + 8.6V output DC supplied to pin 10 of IC8 are compared by the error amplifier inside IC8.
The error output DC voltage error and triangular signal supplied from triangle OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage appears at pin 9 of IC8.
The switching pulse is applied to the base of Q13 switching it ON and OFF.
As a result, the DC voltage whose level is set by the switching pulse width is obtained at the output of the switching regulator circuit consisting of Q13, D15 and L13. The generated DC voltage is fed back to pin 10 of IC8 to maintain constant output voltage.
The regulated + 8.6V is then supplied to the Auto Focus lens.

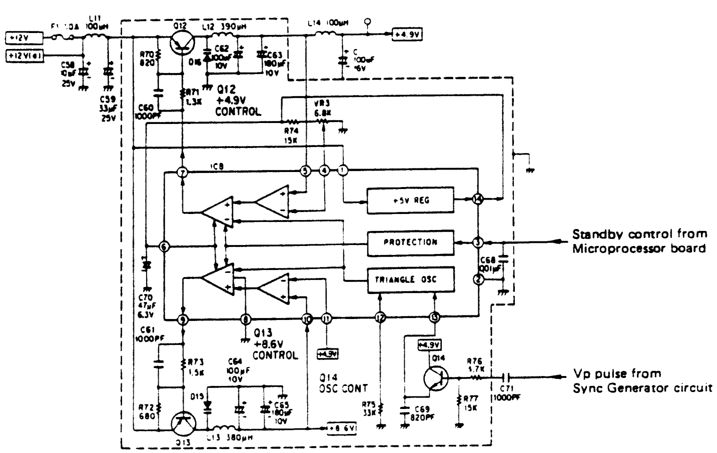


Fig. 4-1 + 8.6V and + 4.9V Regulator Circuit

o + 5V Regulator Circuit

+ 12V DC power from the power supply unit is supplied to the + 5V regulator circuit inside IC8 through pin 1 and + 5V DC voltage obtained at pin 14 is fed to pin 5 of comparator IC9 (a).
The output voltage of Q16/Q17 is applied to pin 6 of IC9 (a) to from a feedback loop, and thus stabilizing the output voltage.
The regulated + 5V is then supplied to the other circuits.

4-2 + 8.6V Regulator Circuit

This circuit generates the regulated + 8.6V DC for other circuit.
The + 8.6V DC voltage is generated by regulating + 8.6V DC power using IC9 (b) and Q15.
The output voltage of Q15 is applied to pin 3 of IC9 (b) to from a feedback loop, thus stabilizing the output voltage.
The reference voltage for pin 2 of IC9 (b) is obtained by dividing the + 8.6V using R78 and R79.

4-3 + 6V Regulator Circuit

This circuit generates the regulated + 6V DC.
The + 6V DC voltage is generated by regulating + 8.4V DC power using IC10 (a).
The output voltage of IC10 (a) is supplied to pin 2 of IC10 (a) to from a feedback loop, thus stabilizing the output voltage.
The + 6V DC obtained at pin 1 of IC10 (a) is fed to other circuits.

4-4 + 1.8V Regulator Circuit

This circuit generates the regulated + 1.8V DC.
The + 1.8V DC voltage is generated by regulating + 4.9V DC power using IC10 (b).
The output voltage of IC10 (b) is supplied to pin 6 of IC10 (b) to form a feedback loop, thus stabilizing the output voltage.
The + 1.8V DC obtained at pin 7 of IC10 (b) is fed to other circuits.

4-5 + 16V/-8V Regulator Circuit

This circuit generates + 16V and -8V DC.
The wide horizontal drive (WHD) pulse from the sync generator IC3 is supplied through buffer Q20, amplifier Q10 and converter driver Q11 to primary winding of transformer T1 to step up the horizontal drive pulse to the necessary level.
The boosted pulses obtained at the secondary winding of T1 are rectified by D12/D13 and D11/D14 to generate -8V and + 16V respectively.
These voltages are supplied to the CCD board through the CCD drive board.

4-6 INT OSC Circuit

This circuit generates the pulses necessary to produce the video signals when no GEN-LOCK INPUT signal is detected by the gen-lock detector circuit in external sync generator IC2.
The EXT/INT control signal from pin 19 of IC2 is supplied to pin 10 of sync generator IC3 placing it in the internal sync mode.
The INT 17MHz oscillator is composed of X2, D5, R19, C78 and C19. The oscillation output is supplied to pin 4 of IC3 and generates subcarrier.
The interval sync vco which is composed of VIC-3 board oscillates 282fH (282 x 15.625KHz = 4.40625MHz) is fed to pin 16 of IC3 and sync, Vp, BFP, WHD, BLK and Clamp Pulse (CP) are generated.
The pin identification of sync generator IC3 is as follows;

Pin No.	Pin Name	In/Out	Description
1	V_{DD1}	In	Power
2	V_{SS1}	——	Ground
3	EX4FSC	In	External 17MHz
4	4FSC OSC	In	Internal 17MHz
5	4FSC OSC	Out	Internal 17MHz
6	SC1	Out	Subcarrier 1
7	SC2	Out	Subcarrier 2
8	BSC	——	Not Used
9	VPCO	——	Not Used
10	EXT/INT	In	EXT/INT Select
11	LSW IN	In	Line Switch Cont
12	LSW	Out	Line Switch
13	V.RESET	In	Vertical Reset
14	EX282FH	In	External Frequency (4.40625MHz)
15	282fH OSC	Out	Internal frequency (4.40625MHz)
16	282fH OSC	In	Internal frequency (4.40625MHz)
17	PCO	Out	Phase Comparator Out
18	SC BLK	Out	SC Blanking Out
19	BFP	Out	Burst Flag Pulse
20	WBLK	Out	Wide Blanking
21	CP2	Out	Clamp Pulse 2
22	CP 1V	——	Not Used
23	C BLK	Out	Composite Blanking
24	WHD	Out	Wide Horizontal Drive
25	VP	Out	Vertical Start Pulse
26	SYNC	Out	Sync
27	V_{SS2}	——	Ground
28	V_{DD2}	——	Power

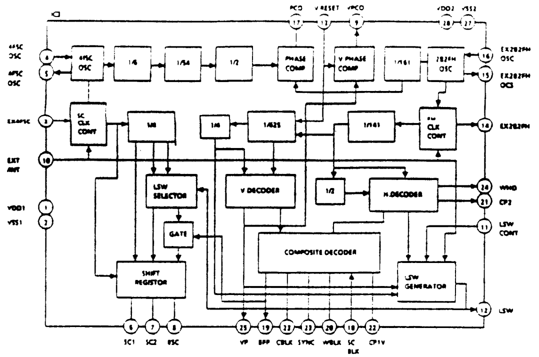

IC3
PCO
V RESET
VPCO
VDD2
VSS2
4FSC OSC
4FSC OSC
4FSC OSC
1/6
1/54
1/2
PHASE COMP
V PHASE COMP
1/161
282FH OSC
EX282FH OSC
EX282FH OCS
EX4FSC
SC CLK CONT
1/8
1/6
1/625
1/161
FH CLK CONT
EX282FH
EXT INT
LSW SELECTOR
V DECODER
1/2
H DECODER
WHD
CP2
VDD1
VSS1
GATE
COMPOSITE DECODER
LSW CONT
SHIFT REGISTOR
LSW GENERATOR
LSW
SC1
SC2
BSC
VP
BFP
CBLK
SYNC
WBLK
SC BLK
CP1V

Fig. 4-2 Block Diagram of IC3

The subcarrier signal (SC1) obtained at pin 6 of IC3 is fed to the zebra signal generator circuit and Process board through buffer Q18.

The SC2 signal obtained at pin 7 of IC3 is fed to the Process board through buffer Q19.

The burst flag pulse (BFP) obtained at pin 19 of IC3 is fed to the Process board.

The wide blanking pulse (WBLK) obtained at pin 20 of IC3 is fed to Process board through inverter Q4 and the WBLK is mixed with the wide horizontal drive (WHD) from pin 24 of IC3 and the clamp pulse 3 (CP3) from the CCD drive board through R33/R36, R35 and R45/R34. The mixed pulse is then fed to Process board through buffer Q6.

The clamp pulse 2 (CP2) obtained at pin 21 of IC3 is fed to other circuits through buffer Q5 and CP2 is mixed with the blanking pulse (C BLK) from pin 23 of IC3 and WHD from pin 24 of IC3 through R38, R37 and R39. The mixed pulse is then sent to Process board.

The blanking pulse (C BLK) obtained at pin 23, the wide horizontal drive (WHD) pulse obtained at pin 24, the vertical start pulse (Vp) obtained at pin 25, and the sync signal obtained at pin 26 of IC3 are fed to other circuits.

4-7 EXT OSC Circuit

When a black burst signal is input to the GEN-LOCK INPUT connector in the Gen-Lock Adaptor WV-AD36, the external sync and burst signals from the Gen-Lock Adaptor are suppliec - EXT pulse generator IC2.

The 17M.:z oscillator (VIC2) and 4.4MHz oscillato (VIC1) become active and oscillate under the control of their respective loops.

The pin identifications and functions of the EXT pulse generator IC2 are as follows;

Pin No.	Pin Name	In/Out	Description
1	SCP SW1	In	SC Phase Select SW1
2	SCP SW2	In	SC Phase Select SW2
3	W HD	In	Wide Horizontal Drive Pulse
4	N/P	In	NTSC/PAL Select
5	BGP	Out	Burst Gate Pulse
6	BSC	In	Gen-lock Burst
7	V_{SS2}	——	Ground
8	V_{DD2}	——	Power
9	GL SYNC	In	Gen-lock Sync
10	FH P2	——	Not Used
11	FH P1	In	H Phase Control
12	HPCO	Out	H Phase Comparator Out
13	XFH OSC	In	4.4MHz OSC (282xfH)
14	XFH OSC	Out	4.4MHz OSC (282xfH)
15	XFH	Out	EXT Frequency (4.4MHz (282xfH))
16	V RESET	Out	V.Reset Pulse Out
17	LSW	In	Line Switch In
18	LSW	Out	Line Switch Cont Out
19	EXT/INT	Out	EXT/INT Select
20	H RESET	——	Not Used
21	TEST	——	Not Used
22	V_{SS1}	——	Ground
23	V_{DD1}	In	Power
24	SC 1	In	SC 1
25	SC PCO	Out	SC Phase Comparator Out
26	4FSC OSC	In	17MHz OSC
27	4FSC OSC	Out	17MHz OSC
28	EX 4FSC	Out	EXT 17MHz

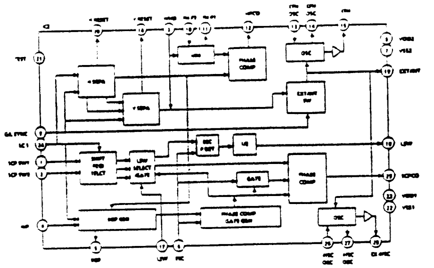

IC2
OSC
PHASE COMP
EXT/INT SW
GATE
PHASE COMP
OSC

Fig. 4-3 Block Diagram of IC2

The EXT 17MHz oscillator composed of X1, D3, D4, C15, C16, R16, R17 and R18 is a VCO (Voltage Controlled Oscillator) whose oscillation frequency is controlled by the phase of the burst signal separated from the black burst signal.

The control DC level obtained at pin 25 of IC2 is fed to the EXT 17MHz oscillator circuit through buffer Q2 in VIC2.

The controlled oscillation frequency is fed to pin 3 of sync generator IC3 through pin 26 and 28 of IC2.

D1, D2, C10, C8, R7, R8, R11, R12 and L3 (GEN-LOCK VCO) in VIC1 is controlled by the phase difference between the wide horizontal drive (WHD) pulse generated by the sync generator IC3 and the horizontal drive (HD) pulse separated from the black burst signal. The phase difference detected in IC2 is converted into a DC voltage. The variable capacitance diode D1 provides control over the oscillation frequency of the VCO by means of this error voltage.

The gen-lock sync signal from the Gen-lock Adaptor WV-AD36 is fed to pin 9 of IC2 through NAND gate IC1 (a).

The gen-lock burst signal from the Gen-lock Adaptor is fed to pin 13 of NAND gate IC1 (c) and the burst gate pulse from pin 5 of IC2 is fed to pin 12 of IC1 (c). The output pulse is sent to pins 6 of IC2 through IC1 (b).

The SC SW control signals 1 and 2 from the Gen-lock Adaptor are fed to pins 1 and 2 of IC2 respectively.

The wide horizontal drive (WHD) pulse from sync generator IC3 is fed to pin 3 of IC2.

The burst gate pulse obtained at pin 5 of IC2 is fed to other circuits.

The horizontal phase control DC from the Gen-lock Adaptor is fed to pin 11 of IC2.

The external frequency obtained at pin 15 of IC2 is fed to sync generator IC3.

The EXT/INT select DC obtained at pin 19 of IC2 is fed to other circuits.

The SC1 from IC3 is supplied to pin 24 of IC2.

4-8 Zebra Signal Generator Circuit

This circuit generates a zebra signal from signals which exceed a specified level (100%). This zebra (slant stripe) signal is supplied to the EVF.

The Y_H signal from the Process board is supplied to pin 4 of comparator IC6 (a). It is compared with the DC voltage set by VR2 (ZEBRA LEVEL) and the compared signal obtained at pin 12 is fed to pin 2 of NAND gate IC7 (a).

The SC1 signal from the sync generator IC3 is supplied to 1/4 SC generator IC5 (a) and (b). The 1/4 SC signal 1.1MHz obtained at pin 8 of IC5 (b) is fed to pin 1 of NAND gate IC7 (a) and generates the zebra signal.

The zebra signal obtained at pin 3 of IC7 (a) is fed to pin 4 of IC7 (b) and the zebra control signal from the video select circuit, the fade control circuit IC6 (b) or SW3 (LEVEL INDICATOR ON/OFF SWITCH) is supplied to pin 5 of IC7 (b).

When a low level signal is supplied to pin 5 of IC7 (b), the zebra signal is not fed out.

When a high level is supplied to pin 5 of IC7 (b), the zebra signal obtained at pin 6 of IC7 (b) is fed to pin 9 of IC7 (c). The zebra select signal from the Microprocessor board is supplied to pin 10 of IC7 (c) and the selected zebra signal is fed to the video select circuit and mixed with the viewfinder video signal.

The zebra signal is also fed to the vertical start pulse (Vp) mix circuit Q8/Q9 for.

The zebra signal is mixed with the Vp pulse and fed to the EVF/Camera Remote Connector through the Audio board.

When the fade button is pressed, the fade control signal from the Microprocessor board is supplied to pin 10 of comparator IC6 (b) and a reference DC voltage is supplied to pin 9 of IC6 (b).

The output signal from pin 7 of IC6 (b) is fed to pin 5 of IC7 (b) and controls the zebra signal.

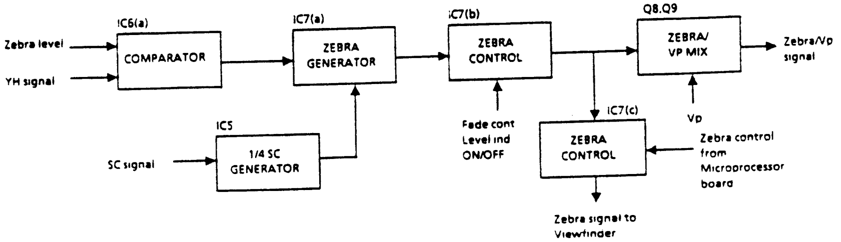

IC6(a)
IC7(a)
IC7(b)
Q8,Q9
Zebra level
YH signal
COMPARATOR
ZEBRA GENERATOR
ZEBRA CONTROL
ZEBRA/VP MIX
Zebra/Vp signal
IC5
SC signal
1/4 SC GENERATOR
Fade cont
Level ind
ON/OFF
IC7(c)
ZEBRA CONTROL
Vp
Zebra control from Microprocessor board
Zebra signal to Viewfinder

Fig. 4-4 Zebra Signal Generator

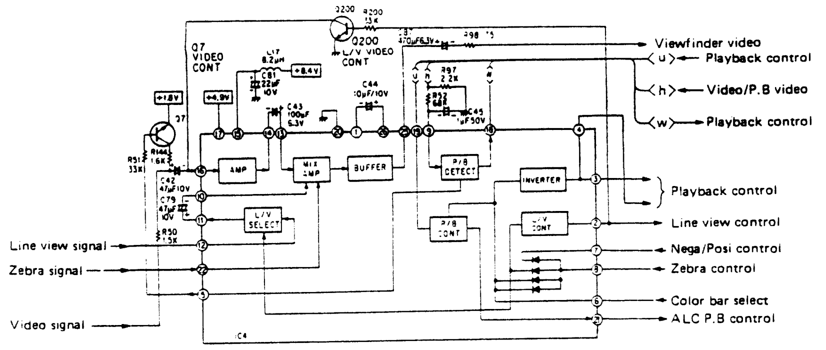

Q200
R200 15K
Q200
L/V VIDEO CONT
C37 470μF6.3V
R98 75
Viewfinder video
Q7 VIDEO CONT
L17 8.2μH
+8.4V
C81 22μF 10V
+1.8V
+4.9V
Q7
C43 100μF 6.3V
C44 10μF/10V
R97 2.2K
R52 68K
C45 1μF50V
u
h
w
Playback control
Video/P.B video
Playback control
R51 33K
R144 1.6K
AMP
MIX AMP
BUFFER
P/B DETECT
INVERTER
Playback control
C42 47μF10V
C79 47μF 10V
L/V SELECT
P/B CONT
L/V CONT
Line view control
R50 1.5K
Line view signal
Nega/Posi control
Zebra signal
Zebra control
Color bar select
ALC P.B control
Video signal
IC4
17
15
14
13
20
1
26
25
19
9
18
4
16
10
11
12
22
5
3
2
7
8
6
21

Fig. 4-5 Video Select Circuit

4-9 Video Select Circuit

The video signal from the Process board is supplied to the amplifier circuit inside IC4 through pin 16. The amplified video signal obtained at pin 14 is fed to the viewfinder through the video/line view signal select circuit and buffer inside IC4 from pin 25.

When the portable VTR is set into the playback mode, the playback signal riding on a DC voltage is supplied from the VTR. The playback signal is removed by C45 and the remaining DC voltage is fed to the playback detect circuit inside IC4 through pin 9. The detected control signal obtained at pin 18 is fed to the Microprocessor board and video controller Q7 is turned OFF.

The playback signal is also fed to the amplifier circuit through the Process board and pin 16 of IC4.

The amplified playback signal obtained at pin 14 of IC4 is sent to the viewfinder through pin 13, the video/line view select circuit and buffer inside IC4 to pin 25.

The playback control signal from the Microprocessor board is supplied to the playback control circuit inside IC4 through pin 19. The control signal is then fed to the lens through pin 21 of IC1 and closes the lens iris, through pin 8 of IC4 and stops the zebra signal, through pins 3 and 4 and stops the video signal.

When the camera is connected to the RCU Adaptor and Remote Control Unit (RCU) and the RCU is set to the color bar position, the color bar signal from the RCU Adaptor is supplied to the amplifier circuit inside IC4 through pin 16.

The amplified color bar signal obtained at pin 14 is fed to the viewfinder through pin 13, the video/line view select circuit, buffer and pin 25 of IC4.

The color bar control signal from the Microprocessor board is supplied to pin 6.

The color bar control signal is then fed to the Process board through the inverter inside IC4 and pins 3 and 4. The color bar control signal is also fed to the zebra signal generator circuit through pin 8 and stops the zebra signal.

When the camera is connected to the RCU Adaptor, RCU and studio lens, and the line view signal is connected to the RCU and the RET switch on the studio lens is set to the ON position, the line view signal from the RCU is supplied to the line view detect circuit inside IC4 through the RCU Adaptor and pin 12 of IC4.

The line view signal obtained at pin 11 is fed to the viewfinder through pin 10 of the video/line view select circuit, the buffer and pin 25 of IC4. The detect signal is also fed to the line view control circuit inside IC4. The control signal obtained at pin 2 is fed to the base of Q200 and turns OFF Q200 and stops the video signal. The line view control signal is also fed to the Microprocessor board.

5. Process Board

The Process board contains following circuits.

5-1 Signal Processing Circuit
5-2 Chroma Detect & White Balance Circuit
5-3 Color Signal Processing Circuit
5-4 Vertical Edge Signal Generator Circuit
5-5 Horizontal Aperture Generator Circuit
5-6 Chroma Encoding Circuit
5-7 Video Processing Circuit
5-8 ATW/AWC Gain Control Circuit
5-9 Pedestal Control Circuit
5-10 Color Title Correction Circuit

5-1 Signal Processing Circuit

5-1-1 Gain Control Circuit

The pre-video signal is fed to pin 19 of IC1 from CCD drive board through pin 2 of CN3.

The pre-video signal is amplified in IC1, and it is fed to 7.3MHz low pass filter CF1 which removes the horizontal transfer pulse component (10.87MHz) from the pre-video signal.

The signal obtained at pin 11 of IC1 is sent to the gain control circuit of which gain is set by the DC voltage fed through pin 14 of IC1. When the AGC Selection Switch on the side of camera is set to the OFF or LOW position, the low level is supplied to pin 14. When the switch is set to the HIGH position, the +5V DC is sent to pin 14 and the gain of amplifier increases +6dB.

The gain controlled signal is then sent to the optical black (OB) clamp circuit. The gain controlled signal obtained at pin 20 of IC1 is also supplied to the auto focus lens.

5-1-2 Optical Black Clamp Circuit

The pre-video signal is fed to the optical black clamp circuit inside IC1. A optical black for blocking the incoming light is built at the end of the horizontal scanning period on the face-plate of CCD image sensor.

When the CCD reads out the optical black portion (A), the dark current of the CCD image sensor is detected and this signal portion (B) is clamped to a fixed DC potential. Therefore the black level variation due to a change of dark current is eliminated.

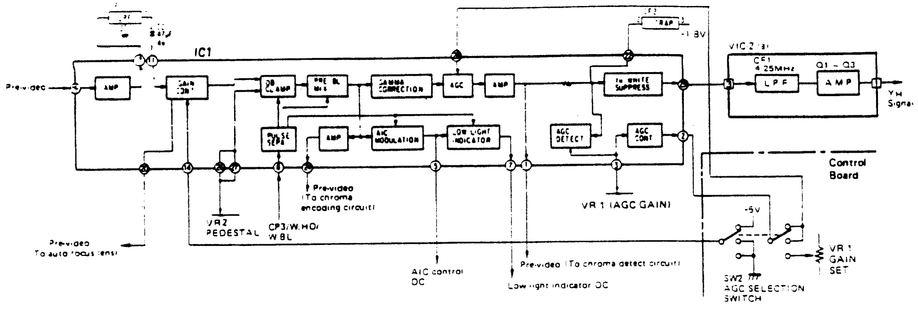


Fig. 5-1 Signal Processing Circuit

In other words, the dark current level (B) of the pre-video signal (B) supplied to the clamp circuit inside IC1 is clamped by the clamp pulse-3 (CP3) (C) separated from the multiplexed signal of CP3, wide horizontal drive (W.HD) and wide blanking (W.BL) pulse inside IC1. (The multiplexed signal of CP3, W.HD and W.BL pulses are generated in the Power/sync board, mixed and then fed to the pulse separator where they are separated.)

Therefore, even if the dark current level drifts due to the temperature variations, the DC potential of the optical black (OB) level is held constant. In this way, the black level variation is corrected.

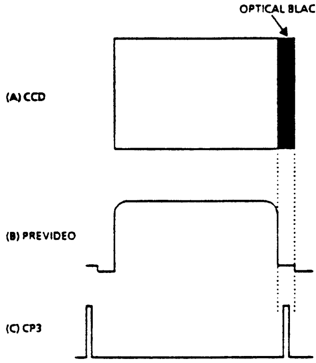


Fig. 5-2 Optional Black Clamp

VR2 (PEDESTAL) sets the pedestal level of the video output signal by adjusting the clamped potential.

The clamped signal is then fed through the preblanking (PRE BL)/W.HD mix circuit to the gamma correction circuit. The pre-video signal from the preblanking mix circuit is also fed through the amplifier in IC1 to the chroma encoding circuit as a chroma clip signal and to the Power/sync board for making the level indicator (zebra) signal.

The pre-video signal is also sent to the auto iris control (AIC) detection circuit.

5-1-3 Gamma Correction Circuit

This circuit corrects the non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and reproduces a linear picture of high fidelity on the monitor.

In order for a televised picture to have the same contrast gradation as the original scene, the system (including the CCD image sensor, signal processing inside camera and monitor, and CRT) gamma must be equal to 1.

The gamma characteristic of CCD image sensor is approx. 1.0 and the gamma characteristic of the monitor CRT is approx. 2.2, so that the gamma characteristic of the gamma correction circuit should be approx. 0.45, which makes the total gamma to be approx. 1.0.

The pre-video signal is fed to the gamma (γ) correction circuit and undergoes the gamma correction inside IC1.

5-1-4 Automatic Iris Control Detection Circuit

The pre-video signal is fed from the optical black clamp circuit to the modulation circuit, where the pre-video signal is modulated by the wide blanking (W.BL) pulse.

The modulated pre-video signal is peak-rectified in the modulation circuit and converted into DC voltage corresponding to the luminance level i.e., the incoming light intensity. This DC voltage is fed through pin 5 of IC1 to the automatic iris control circuit in the Microprocessor board. The DC voltage is also supplied to the low light indicator circuit in IC1.

When the camera is operated in the normally illuminated scene, the output from the low light indicator at pin 7 of IC1 is low level. However, when the camera is aimed at the weakly illuminated scene, the output becomes high level and it is sent to the Microprocessor board for displaying the low light indicator in the viewfinder.

5-1-5 Automatic Gain Control (AGC) Circuit

The pre-video signal from the gamma correction circuit is fed through the AGC amplifier and amplifier to 5.43MHz trap CF2 which removes the modulated red and blue component and the luminance (Y) signal is obtained. The Y signal is supplied to the AGC detect circuit where the Y signal is peak-rectified and converted into DC voltage corresponding to the Y signal level i.e., the incoming light intensity. This DC voltage is then fed to the AGC control circuit where it is compared with the reference DC voltage. The error between the DC voltages is fed back through the AGC Selection Switch on the side of camera to the AGC amplifier to control the gain of the amplifier and the constant Y signal level is obtained. When the AGC selection switch is set to the LOW or HIGH position, the gain is automatically controlled.

When the switch is set to the OFF position, this gain control loop is opened and the gain of the AGC amplifier is set by the VR1 (GAIN SET) on the Control board.

In this way, the signal level corresponding to normal and relatively high illumination is kept constant by the lens iris opening, while the signal level corresponding to relatively low illumination is controlled by the AGC circuit.

The amplified pre-video signal is fed to the Y_H signal circuit, and the chroma detect & white balance circuit through pin 1 of IC1.

5-1-6 Y_H Signal Circuit

The Y signal obtained by removing the modulated component with trap CF2 is sent through the Y_H white suppress circuit in IC1,

4.25MHz low pass filter (LPF) to amplifier consisting of Q1 - Q3. The amplified Y signal is then sent to the vertical edge signal generator circuit as a Y_H signal which has relatively high frequency response.

5-2 Chroma Detect & White Balance Circuit

The pre-video signal is sent from the signal processing circuit through pin 22 of IC2 to the amplifier. VR3 (R/B GAIN) is a control to set the gain of the amplifier. The amplified pre-video signal (A) is then sent to band pass filter CF5 which passes only 5.43MHz component and extracts the modulated red and blue component (B). The signal (B) is then sent to the phase detector in IC2 where the signal (B) is phase-detected and the signal (C) which has the R and B signal alternatively by line is obtained. VR4 (PHASE DETECT) adjusts the phase of carrier signal sent through pin 5 of IC2 for extracting the maximum R and B signal.

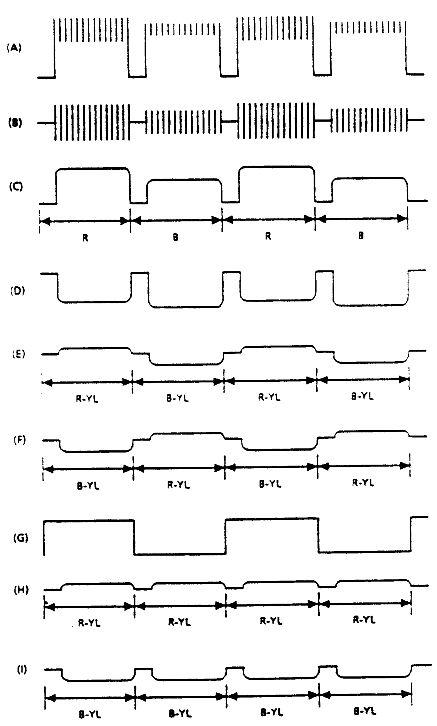


Fig. 5-3 Chroma Detect & White Balance

The previdee signal at pin 22 of IC2 is also sent to 0.8MHz low pass filter (LPF) and the luminance (Y_L) signal having low frequency response is obtained.

The Y_L signal is then fed to the gain control amplifier. The amplified and gain-controlled Y_L signal (D) and the phase-detected R and B signal (C) are subtracted each other and the $R-Y_L$ and $B-Y_L$ (E) color difference signal which appears alternatively by line is obtained.

The Y_L signal level for the $R-Y_L$ and $B-Y_L$ signal is controlled separately in the gain control amplifier by the DC voltage fed from analog switch IC4 in order to have proper white balance.

The $R-Y_L$ and $B-Y_L$ color difference signal is then supplied through 2MHz LPF CF4 to pin 8 and 10 of IC2. CF4 removes the carrier component generated in the phase detector.

The non-delayed R-Y_L and B-Y_L signal obtained at pin 8 of IC2 is supplied to 1H delay circuit IC3. In IC3, the R-Y_L and B-Y_L signal modulates the subcarrier signal sent through pin 7 of IC3 and is delayed 1H (NTSC : 63.5 µsec, PAL : 64 µsec). The delayed signal is amplified and fed to 1.8MHz LPF CF6 where the R-Y_L and B-Y_L signal is demodulated by removing the subcarrier component. The 1H delayed signal (F) is then fed through amplifier to pins 1 and 12 of analog switch IC4.

The non-delayed R-Y_L and R-Y_L signal obtained at pin 10 of IC2 is also supplied to pins 2 and 13 of IC4.

A 1/2fH pulse (G) is fed to control terminals (pins 9-11) of analog switch IC4 and it switches IC4 by line. As a result, the R-Y_L and B-Y_L signal are separated and the R-Y_L signal (H) is obtained at pin 15 of IC4 and the B-Y_L signal (I) at pin 14 of IC4.

One other switch in IC4 is used to select the DC voltage for controlling the Y_L signal level for the R-Y_L signal or B-Y_L signal.

5-3 Color Signal Processing Circuit

The R-Y_L signal obtained at pin 15 of analog switch IC4 is fed through buffer Q2 to the clamp circuit in IC5 where the blanking level of the R-Y_L signal is clamped by the clamp pulse-5 (CP5) sent from the pulse separator. Similarly the B-Y_L signal obtained at pin 14 of IC4 is supplied through VR5 (B-Y_L GAIN) and buffer Q3 to the clamp circuit.

The clamped R-Y_L and B-Y_L signals are gain-controlled by the DC voltages sent to pins 27 and 4 of IC5 for correcting the color reproduction when the camera is used in the ATW mode and the color temperature changes.

The gain-controlled R-Y_L and B-Y_L signal are then sent to the chroma encoding circuit. These signals are also sent to the 32-pin connector on the rear of the camera.

The luminance (Y_H) signal having high frequency response is supplied from the vertical edge signal generator circuit to the Y_H matrix circuit in IC5. In this circuit, the R-Y_L and B-Y_L signal is mixed to correct the brightness of red and blue color. The Y_H signal is then sent to the video signal processing circuit.

The red and blue suppress/gamma circuit and amplifier/inverter in IC5 is a part of automatic tracing white-balance (ATW) circuit.

The DC voltages which are converted from the red and blue light with the ATW sensor are sent to the suppress/gamma circuit for matching the photo electric conversion characteristic between the CCD/processing circuit and ATW sensor against the color temperature variation. The DC voltage for B gain control is sent to the amplifier/inverter since the variation of R and B signal level against the color temperature shift is always opposite.

5-4 Vertical Edge Signal Generator Circuit

This circuit generates a 2H vertical edge signal for increasing the vertical resolution by enhancing vertical edge contrast of an object.

The Y signal obtained in the signal processing circuit is amplified by amplifier Q1 ~ Q3 of the VIC2. CF1 on the VIC2 is a 4.25MHz low pass filter (LPF) for limiting the band width of the luminance (Y_H) signal having high frequency response.

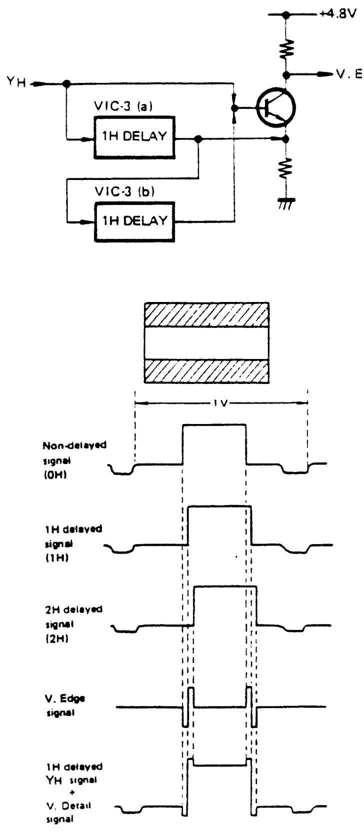


Fig. 5-4 Vertical Edge Signal

The amplified Y_H signal (A) at pin 1 of VIC2 is then sent to pin 1 of VIC4 as a non-delayed Y_H signal. The Y_H signal (A) is also fed to 1H delay circuit IC1 on the VIC3 (a) through buffer Q2. VR1 (1H DELAY BIAS) sets the DC bias of IC1 and it is added to the Y_H signal through Q1.

The subcarrier (SC) signal is sent from the Power/sync board through pin 20 of CN2 to pin 3 of 4fsc generator IC6 where four times of SC frequency and synchronized to the SC signal is generated at pin 6 of IC6. The 4fsc signal is then fed through pin 3 of VIC3 (a) to IC1 and it is modulated by the Y_H signal and then delayed 1H (NTSC : 63.5 µsec, PAL : 64 µsec).

The 1H-delayed Y_H signal (B) obtained at pin 3 of IC1 is supplied through amplifier Q3/Q4 and buffer Q5 on VIC3 (a), clamp circuit Q4/Q5 and buffer Q6 to pin 5 of VIC4.

CF1 on VIC3 (a) is a low pass filter which removes the 4fsc component and its harmonics from 1H-delayed Y_H signal. VR1 (Y_H (1H) GAIN) sets the level of 1H-delayed Y_H signal.

The Y_H signal (B) obtained at the emitter of buffer Q6 is also fed through buffer Q7 to the color signal processing circuit and the horizontal aperture generator circuit.

It also goes through buffer Q1 to another 1H delay board VIC3 (b) to generate the 2H-delayed Y_H signal.

VIC3 (b) works same as VIC3 (a). The 1H-delayed Y_H signal is fed through delay bias Q1 and buffer Q2 to 1H delay circuit IC1 on the VIC3 (b). The 1H-delayed Y_H signal modulates 4fsc signal sent to pin 3 of VIC3 (b) and delayed 1H (NTSC :63.5 µsec, PAL : 64 µsec) in IC1 to generates a 2H-delayed Y_H signal.

The 2H-delayed Y_H signal (C) is then applied through amplifier Q3/Q4 and buffer Q5 to pin 8 of VIC4. VR1 (2H DELAY BIAS) and VR2 (Y_H (2H) GAIN) on VIC3 (b) set the DC bias of IC1 and the level of 2H-delayed Y_H signal respectively. CF1 is a LPF to remove 4fsc component and its harmonics.

The non-delayed Y_H signal (A) and the 2H-delayed Y_H signal (C) sent to the base of Q1 on VIC4 is mixed with the 1H-delayed Y_H signal (B) fed to the emitter of Q1 and the 2H vertical edge signal (D) is generated at the collector of Q1.

The vertical edge signal (D) is then sent through buffer Q2, LPF CF1, amplifier IC1 and noise coring circuit D1/D2 to pin 6 of VIC4 where it is mixed with the horizontal aperture signal. CF1 removes 4fsc frequency component and the noise coring circuit D1/D2 suppresses the noise on the vertical edge signal. VR1 (V.EDGE BALANCE) cancels the Y_H signals for generating only the V.edge signal.

The mixed signal of V.edge and H.aperture signal is sent through aperture suppress circuit in IC1 of VIC1 and aperture amplifier Q9/Q10 and mixed to the Y_H/chroma signal in IC7. Q8 suppress the V.edge and H.aperture signal level when the AGC Selection Switch is set to the HIGH position. In the HIGH position, the high level is fed to the gate of Q8 turning it ON and signal level is suppressed to reduce the noise.

The H.aperture and V.edge signal is also sent through amplifier IC2 to the auto iris lens.

5-5 Horizontal Aperture Generator Circuit

This circuit generates the horizontal aperture signal for enhancing the horizontal resolution.

When the camera is aimed at an object (A) for example, the 1H-delayed Y_H signal generated in the vertical edge signal generator circuit is fed through pin 9 of VIC4 and pin 14 of IC2 to H.aperture generator in IC2 as a non-delayed Y_H signal (B). The Y_H signal (B) is also supplied to 110 nsec delay line CF2 and a 110 nsec-delayed Y_H signal (C) is fed to the H. aperture generator. The output impedance of CF2 and input impedance of H.aperture generator is mis-matched. The Y_H signal (C) is therefore reflected back through CF2 to pin 14 of IC2 and the Y_H signal (D) delayed again (220 nsec) is sent to H. aperture generator. In the H.aperture generator, the 110 nsec-delayed Y_H signal (C) is amplified and mixed with the non-delayed Y_H signal (B) and 220 nscec-dealyed Y_H signal (D). As a result, a H.aperture signal (E) is obtained at pin 11 of IC2. The H.aperture signal is then amplified in IC2 and fed to pin 6 of VIC4 where it is mixed with the vertical edge signal. The H.aperture and V.edge signal are then supplied through aperture suppress circuit in IC1 of VIC1 and aperture amplifier Q9/Q10 to IC7 and mixed with the Y_H/Chroma signal in order to enhance the horizontal and vertical resolution (F).

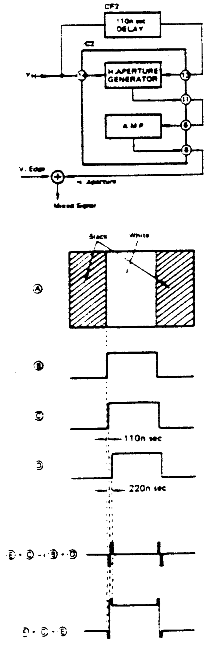


Fig. 5-5 Horizontal Aperture Signal

5-6 Chroma Encoding Circuit

5-6-1 Chroma Signal Generator Circuit

This circuit generates the chrominance signal from the R-Y_L and B-Y_L color difference signals sent from the color signal processing circuit. The chrominance signal is supplied to the video signal processing circuit.

The subcarrier (SC1) signal is fed from the Power/sync board through pin 20 of CN2, pin 27 of VIC1 and pin 16 of IC1 to the B-Y_L modulator. At the same time, the SC2 signal is sent to the R-Y_L balance modulator through pin 24 of VIC1 and pin 14 of IC1. The SC1 signal at the emitter of Q9 is fed to an optional character generator such as WV-KB12. The SC2 obtained at the emitter of Q10 to an optional character generator too.

The R-Y_L signal is sent through pin 20 of VIC1 to the emitter of buffer Q1 where it is mixed with the burst flag pulse (BFP) comes through C1. The mixed signal is then sent to clamp circuit through Q2 and pin 3 of IC1 where the blanking period of R-Y_L signal is clamped by the clamp pulse-2 (CP2) from the pulse separator in IC1. The clamped R-Y_L signal is then fed to the R-Y_L balance modulator circuit and modulates the R-Y_L SC signal fed through pin 14 of IC1.

Similarly, the B-Y_L signal is fed through pin 29 of VIC1, Q3, Q4, pin 4 of IC1 and B-Y_L clamp circuit to the B-Y_L balance modulator where it modulates the B-Y_L SC signal sent through pin 16 of IC1.

The R-Y_L modulated signal with the burst signal and the B-Y_L modulated signal are fed to the chroma clip/suppress circuit and added together forming the chrominance signal with the burst signal. (The chroma clip/suppress circuit will be explained in the next.)

The chrominance signal with the burst signal (A) obtained at pin 12 of IC1 is sent to VR1 (CHROMA GAIN). The positive wide horizontal drive (W.HD) pulse (B) is sent to the gate of Q6 and Q6 turns ON during the positive duration. As a result, the burst signal is removed and only the chrominance signal (C) is detected.

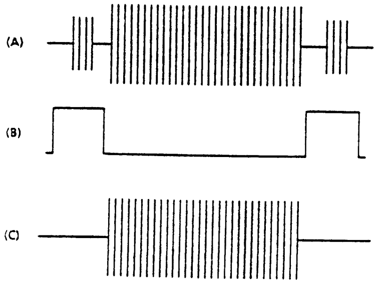


Fig. 5-6 Chroma Signal

The chrominance signal thus obtained is then sent through VR1, phase shifter Q12 and buffer Q11 to the video processing circuit. CT2 (CHROMA PHASE) is a control to shift the phase of the chrominance signal.

5-6-2 Chroma Clip/Suppress Circuit

The chrominance signal with the burst (A) is supplied to the chroma clip/suppress circuit from the R-Y_L and B-Y_L balance modulator circuits. The pre-video signal (B) from pin 24 of IC1 in the signal processing circuit is supplied through pin 22 of VIC1 and pin 10 of IC1 to the chroma clip/suppress circuit where the chrominance signal corresponding to the excessively bright object is clipped (C) and does not reach the video output.

The chrominance signal obtained at pin 6 of VIC1 is fed to IC8 where the Highly saturated chrominance signal is suppressed to prevent overmodulation.

5-6-3 Burst Generator Circuit

The chrominance signal with the burst signal (A) obtained at pin 12 of IC1 is fed to burst gate Q5. The burst flag pulse (BFP) (B) is sent to the gate of Q5. During the positive period of BFP, Q5 is turned ON and the only the burst signal (C) is detected. The burst signal is then sent through the low band pass filter (BPF) consisting of L2 and C20, VR2 (BURST GAIN), phase shifter Q8, buffer Q7. The burst signal at the emitter Q7 is mixed with the sync pulse (D) through R59/R60 and the black burst signal (E) is made. The black burst signal is then fed to the video processing circuit to be added to the video signal. CT1 (BURST PHASE) adjusts the phase of the burst signal.

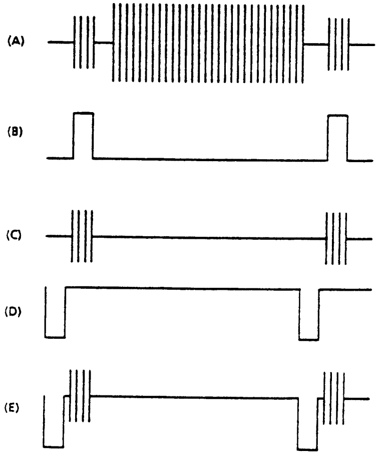


Fig. 5-7 Burst Sigal

5-6-4 White Set Detection Circuit

The clamped R-Y_L, the clamped B-Y_L and the clamped sync pulse are respectively fed to the detection circuits and their center portions are gated by the wide blanking (W.BL) pulse supplied through pin 21 of IC1 of VIC1 in order to set the white balance with the signal corresponding to the center image. The clamped sync pulse is gated by the W.BL pulse, the sync pulse is removed and only the clamp DC voltage is detected as a reference DC voltage.

The gated signals are converted into the DC voltage in the detection circuit and fed through pins 18, 19 and 20 of IC1 to the Microprocessor board.

5-7 Video Signal Processing Circuit

The luminance (Y_H) signal is sent from the color signal processing circuit through VR6 (Y_H GAIN) and delay line CF7 and pin 2 of IC7 to the Y/chroma aperture mix circuit in IC7. CF7 delays the Y_H signal 240 nsec to match its phase to the horizontal aperture signal.

The chrominance signal is supplied to the chroma gain control circuit inside IC7 through pin 22. The gain control DC voltage fed via pin 20 to chroma gain control circuit to set the chrominance signal level. The chrominance signal undergoes the chroma gain control is fed to the Y/chroma/aperture mixing circuit inside IC7.

The vertical edge signal and the horizontal aperture signal are fed to the Y/chroma/aperture mixing circuit through pin 4 of IC7.

The Y_H signal, the chrominance signal and the aperture signal are mixed and the mixed signal is supplied to the fade circuit where its signal level is controlled by the fade control signal supplied from the Microprocessor board through pin 24 of IC7.

The signal from the fade control circuit is sent to the negative/positive selection circuit. In the normal operating condition, the high level is sent from the Microprocessor board to the nega/posi select circuit through pin 21 of IC7 and the positive picture is produced. When the nega/posi selection switch on the grip is pressed, the low level is fed to the nega/posi select circuit, the signal is inverted and the negative picture is displayed. Therefore when the camera is used for shooting the negative film, the normal picture can be observed by pressing the nega/posi select switch on the camera.

However, since the color reproduction characteristic of negative film is different from video picture, the chrominance signal amplitude corresponding to the high Y level is extremely high. Q17 suppresses the chrominance signal when the camera is used in the negative position. In the negative position, the low level of nega/posi control signal is fed to the base of Q17 turning OFF Q17. When the Q17 is turned OFF, the Y_H signal is fed through R31, R33 and pin 20 of IC7 to the chroma gain control circuit where the Y_H signal suppresses the chrominance signal corresponding to the high Y level. In the positive position, the high level is sent to the base of Q17 and Q17 is turned ON. Therefore, the Y_H signal is not fed to the chroma gain control circuit.

The video signal is then sent to the video gate circuit. When an optional character generator WV-KB12/WV-KB12A is used with the camera, the character generated in the character generator is sent through pin 9 of IC7 and the ext nega/posi control circuit to the video gate circuit where the Y/chroma signal corresponding to the character position is gated and removed by the character signal and the color/chroma signal sent from the color title correction circuit to the video gate circuit through pin 10 of IC7 is inserted instead. Since potential of pin 5 of IC7 is high level, the positive character signal is selected and sent to the video gate circuit.

The Y/chroma signal from the video gate circuit is fed to the character mix circuit. In this circuit, the black-and-white title, date or time character which is generated in the Microprocessor board and sent through pin 15 of IC7 is mixed with the Y/chroma signal. The mixed signal is then fed through buffer Q11 to the clamp circuit where the blanking level of the mixed signal is clamped by the clamp pulse-2 (CP2) supplied from the pulse separator. The wide horizontal drive (W.HD) pulse sent to the base of Q11 from the pedestal control circuit sets the pedestal level of the video signal.

The clamped signal is then sent to the BL mix/high clip/low clip circuit, where it is mixed with the blanking (BL) pulse. The high clip circuit clips the signal exceeds 120% (0.85V) and the low clip circuit clips the low level portion of mixed signal for setting the pedestal level. The mixed signal of chrominance and luminance signals which undergoes the high and low clip is mixed with the mixed signal of sync and burst signal in the video output circuit forming a composite signal. The composite video signal is then fed through the video out circuit in IC7, C38 and R61 to the 10-pin VTR connector, and 32-pin connector on the rear of camera. The composite video signal is also sent to the 1" viewfinder through pin 9 of CN2 and the Power/sync board.

When the portable VTR is set to the playback mode, about +6V DC is sent through 10-pin VTR connector together with the playback signal. This DC voltage is detected in the Power/sync board and the +4.9V DC is supplied to D1 and D2 as a playback control signal to turn ON them. The +4.9V is applied to the playback control circuit in IC7, the video out circuit in IC7 stops supplying the video signal. As a result, the playback signal sent through R61 and C38 is applied to the 1" viewfinder.

5-8 ATW/AWC Gain Control Circuit

This circuit receives the DC voltages which controls the gain of luminance (Y_L) signal level for the R-Y_L and B-Y_L color difference signal in the automatic tracing white-balance (ATW) and the automatic white balance control (AWC) operation in order to set proper white balance.

The DC voltage which controls the Y_L signal for the R-Y_L signal is fed from the Microprocessor board through pin 18 of VIC2, DC amplifier IC1 (d) and IC1 (a) and pin 13 of VIC2 to pin 5 of analog switch IC4. Similarly, the DC voltage for controlling the Y_L signal level of B-Y_L signal is sent from the Microprocessor board through pin 9 of VIC2, DC amplifier IC1(c) and (b) and pin 12 of VIC2 to pin 3 of IC4. Since the [illegible]H pulse is sent to the control terminal (pin 9) of IC4, the DC voltage for R-Y_L and B-Y_L signal is selected alternatively by line. The selected DC voltage at pin 4 of IC4 is supplied to the chroma detect & white balance circuit to control the Y_L signal level.

5-9 Pedestal Control Circuit

This circuit controls the total pedestal level of the video signal when the camera control unit (RCU) is connected with the camera and the Total Pedestal Control on the RCU is adjusted. The pedestal control signal sent from the RCU as serial data is converted into the analog signal in the Microprocessor board. The analog pedestal control signal is then fed to Q14 of VIC1. The wide horizontal drive (W.HD) pulse is sent from the Power/sync board through inverter Q13 to Q14. When the DC voltage at the base of Q15 is controlled as the Total Pedestal Control on the RCU is turned, the signal level of positive W.HD pulse obtained at the collector of Q14 is adjusted. This positive W.HD pulse is then mixed with the negative W.HD pulse obtained at the collector of Q13. As a result, the W.HD pulse whose polarity and signal level is controlled is made. This W.HD pulse is applied through amplifier Q12 to the base of Q11 in the video signal processing circuit and mixed with the video signal to set the pedestal level.

5-10 Color Title Correction Circuit

This circuit receives the subcarrier signal from an optional character generator WV-KB12 and sends it to the video processing circuit to display the color title. This circuit also controls the luminance level of the title.

The subcarrier signal whose phase is set by the character generator is sent to phase shifter Q15/Q14 to the video processing circuit for the color titling. The DC voltage is sent from the character generator through buffer Q16 to the video processing circuit for setting the luminance level of the color title. When the white title is selected, approximately +4V is sent. When the color title is selected, approximately +3V is fed. When the red and blue title is selected, the high level is also sent to the base of Q13 turning ON Q13 to lower the DC voltage sent to the video processing circuit.

6. Microprocessor Board

The Microprocessor Board contains the following circuits.

6-1	Microprocessor & D/A Output Circuit
6-2	Power Detect Circuit
6-3	+3V Regulator & Reset Circuit
6-4	+5V Regulator Circuit
6-5	AIC Control Circuit
6-6	Zoom Control Circuit
6-7	AF/Character Mixing Circuit

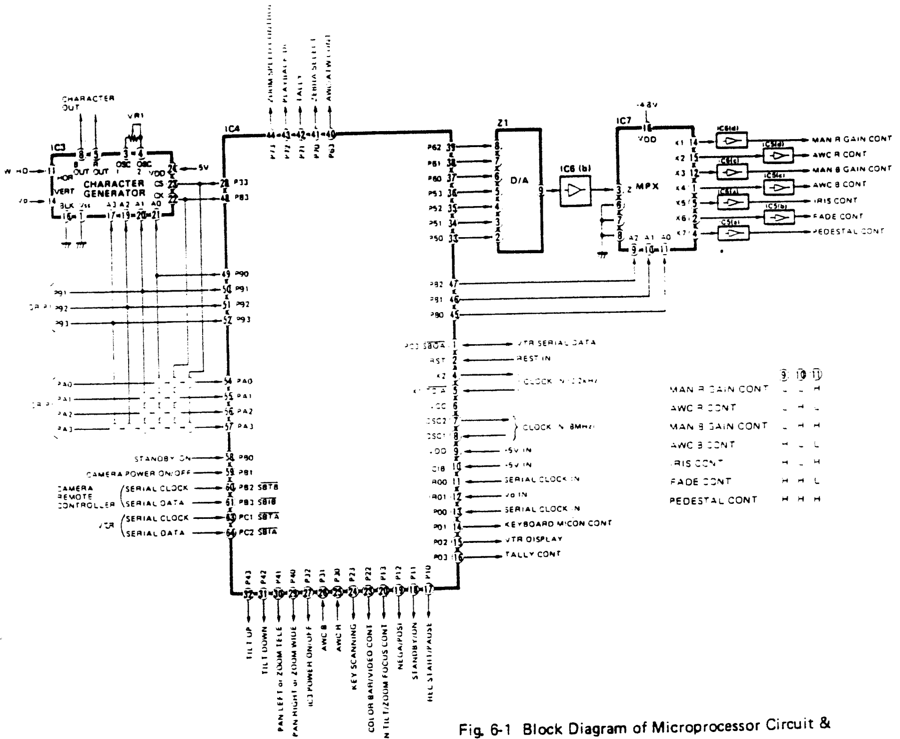
6-1 Microprocessor & D/A output circuit

The microprocessor circuit is consisting of IC4 (Microprocessor) and IC3 (Character Generator) and others. The pin identifications and functions of the character generator IC3 and microprocessor IC4 are described in Table 6-1 and 6-2 respectively.

IC3 M50450FP
Pin identifications

Pin No.	Name	In/Out	Descriptions
1	Vss	——	Ground
2	Ac	——	Not Used
3	OSC1	In	Clock pulse generator
4	OSC2	Out	Clock pulse generator
5	R	Out	R character output (VBS + EVF)
6	G	Out	Not used
7	NC	——	Not used
8	B	Out	B character output (EVF only)
9	BLNK	Out	Not used
10	Out	Out	Not used
11	HOR	In	H sync input
12	NC	——	Not used
13	NC	——	Not used
14	VERT	In	V sync input
15	TEST	In	Not used
16	BCK	In	Ground
17	A3	In	Data input Bus-3
18	NC	——	Not used
19	A2	In	Data input Bus-2
20	A1	In	Data input Bus-1
21	A0	In	Data Input Bus-0
22	CK	In	Data clock input
23	CS	In	Chip select input
24	VDD	In	+5V power supply input

Table 6-1 Pin identification of IC3 (Character Gen.)


CHARACTER OUT
VR1
IC3
CHARACTER GENERATOR
VERT
BLK
Vss
A3 A2 A1 A0
CS
CK
VDD
+5V
IC4
P33
PB3
P90
P91
P92
P93
PA0
PA1
PA2
PA3
STANDBY ON
CAMERA POWER ON/OFF
CAMERA REMOTE CONTROLLER
SERIAL CLOCK
SERIAL DATA
VTR
PB2 SBTB
PB3 SBIB
PC1 SBTA
PC2 SBTA
Z1
D/A
IC6 (b)
IC7
MPX
VDD
+4.8V
P62
P61
P60
P53
P52
P51
P50
PB2
PB1
PB0
VTR SERIAL DATA
REST IN
CLOCK IN 32kHz
CLOCK IN 8MHz
+5V IN
SERIAL CLOCK IN
Vo IN
KEYBOARD MICON CONT
VTR DISPLAY
TALLY CONT
MAN R GAIN CONT
AWC R CONT
MAN B GAIN CONT
AWC B CONT
IRIS CONT
FADE CONT
PEDESTAL CONT
TILT UP
TILT DOWN
PAN LEFT or ZOOM TELE
PAN RIGHT or ZOOM WIDE
IC3 POWER ON/OFF
AWC B
AWC H
KEY SCANNING
COLOR BAR/VIDEO CONT
PAN TILT/ZOOM FOCUS CONT
NEGA/POSI
STANDBY/ON
REC START/PAUSE

	⑨	⑩	⑪
MAN R GAIN CONT	L	L	H
AWC R CONT	L	H	L
MAN B GAIN CONT	L	H	H
AWC B CONT	H	L	L
IRIS CONT	H	L	H
FADE CONT	H	H	L
PEDESTAL CONT	H	H	H

Fig. 6-1 Block Diagram of Microprocessor Circuit & D/A Optput Output

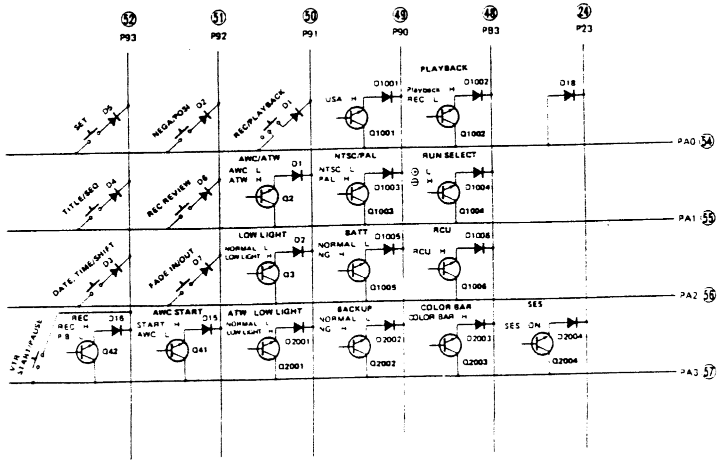

(52) P93
(51) P92
(50) P91
(49) P90
(48) PB3
㉔ P23
SET
D5
NEGA/POSI
D2
REC/PLAYBACK
D1
USA H
D1001
Q1001
PLAYBACK
Playback H
REC L
D1002
Q1002
D18
PA0 (54)
TITLE/SEQ
D4
REC REVIEW
D6
AWC/ATW
AWC L
ATW H
Q2
NTSC/PAL
NTSC L
PAL H
D1003
Q1003
RUN SELECT
D1004
Q1004
PA1 (55)
DATE, TIME/SHIFT
D3
FADE IN/OUT
D7
LOW LIGHT
NORMAL L
LOW LIGHT H
Q3
BATT
NORMAL L
NG H
D1005
Q1005
RCU
RCU H
D1006
Q1006
PA2 (56)
VTR START/PAUSE
REC
REC H
PB L
D16
Q42
AWC START
START H
AWC L
D15
Q41
ATW LOW LIGHT
NORMAL L
LOW LIGHT H
D2001
Q2001
BACKUP
NORMAL L
NG H
D2002
Q2002
COLOR BAR
COLOR BAR H
D2003
Q2003
SES
SES ON
D2004
Q2004
PA3 (57)

Fig. 6-2 Input Matrix Circuit

IC4 MN1754CVS

Pin identification

Pin No.	Name	In/Out	Descriptions
1	PC3/SB0A	Out	Serial data output for VTR or RCU
2	RST	In	Reset in
3	SYNC	Out	Not used
4	X2	Out	Clock pulse generator (32KHz)
5	X1/TCIA	In	Clock pulse generator (32KHz)
6	Vcc	——	Ground
7	OSC2	Out	Clock pulse generator (8MHz)
8	OSC1	In	Clock pulse generator (8MHz)
9	VDD	In	+5V in
10	TCIB	In	+5V in
11	IRQ0	In	Serial clock in from VTR or RCU
12	IRQ1	In	V sync in
13	P00	In	Serial clock in from VTR or RCU
14	P01	Out	Keyboard control H : REC, PLAY, INSERT L : other than REC, PLAY, INSERT
15	P02	Out	F-VTR display
16	P03	Out	Tally cancel output
17	P10	Out	REC start/pause output H : STOP, L : RUN (START)
18	P11	Out	Standby/on output H : STANDBY, L : ON
19	P12	Out	Nega/Posi control H : NEGA, L : POSI
20	P13	Out	Pan.Tilt/Zoom Focus Select control H : Pan.Tilt, L : Zoom Focus
21	P20	Out	Not used
22	P21	Out	Not used
23	P22	Out	Color bar/Video select control H : Video, L : Color bar
24	P23	Out	Key scanning output
25	P30	In	AWC R H : UP, L : DOWN
26	P31	In	AWC B H : UP, L : DOWN
27	P32	Out	IC3 power ON/OFF H : OFF, L : ON
28	P33	Out	Output for "CS" of IC3
29	P40	Out	Pan.right or Zoom.wide
30	P41	Out	Pan.left or Zoom.tele
31	P42	Out	Tilt down
32	P43	Out	Tilt up
33	P50	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED (LSB)
34	P51	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
35	P52	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
36	P53	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
37	P60	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
38	P61	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
39	P62	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED (MSB)
40	P63	Out	AWC/ATW selection output H : ATW, L : AWC
41	P70	Out	Zebra selection output L : Zebra ON
42	P71	Out	Tally output H : REC
43	P72	Out	Playback DC output H : Playback
44	P73	Out	Zoom speed control H : FAST
45	P80	Out	D/A converter control output for "A0" of IC7
46	P81	Out	D/A converter control output for "A1" of IC7
47	P82	Out	D/A converter control output for "A2" of IC7
48	P83	Out	Key scanning pulse output, Data output for "CK" of IC3
49	P90	Out	Key scanning pulse output, Data output for "A0" of IC3
50	P91	Out	Key scanning pulse output, Data output for "A1" of IC3
51	P92	Out	Key scanning pulse output, Data output for "A2" of IC3
52	P93	Out	Key scanning pulse output, Data output for "A3" of IC3
53	EXPS	In	Not used
54	PA0	In	Key scanning pulse input
55	PA1	In	Key scanning pulse input
56	PA2	In	Key scanning pulse input
57	PA3	In	Key scanning pulse input
58	PB0	In	Standby/On control H : STANDBY L : ON
59	PB1	In	Camera power ON/OFF control H : ON, L : OFF
60	PB2/SBTB	In	Serial clock input from camera remote controller
61	PB3/SBIB	In	Serial data input from camera remote controller
62	PC0/SB0B	Out	Not used
63	PC1/SBTA	In	Serial clock input from VTR or RCU
64	PC2/SBIA	In	Serial data input from VTR or RCU

Table 6-2 Pin identification of IC4 (Microprocessor)

First, the programmed signals (key scan pulses) are supplied from P23, PB3, P90, P91, P92 and P93 to the input interface circuits.

Then, these programmed signals are supplied from the input interface circuits to input ports PA0, PA1, PA2 and PA3 through switches and transistors. (Refer to Fig. 6-5 Input matrix circuit.)

According to the programmed signals at input ports PA0, PA1, PA2 and PA3, the microprocessor identifies the instruction and supplies the instructional signals (PB3, P90, P91, P92 and P93) to character generator IC3 and other output terminals of IC4.

Serial data transmission

When the portable color video cameras WV-F10 is used with the portable video cassette recorder NV-180, the serial data transmission system is performed between the equipment through the 10 pin VTR connector.

The following serial data is supplied from the VTR to the camera.

- Battery level
- Tape counter display (Number)

The following serial data is supplied from camera to the VTR.

- Remote control of playback (PLAY, SLOW, CUE, REVIEW)
- REC/Playback Selection Signal

When the camera is used with the camera remote controller WV-CR12 or Remote Control Unit WV-RC35, the serial data transmission system is performed between the equipment through the 10 pin EVF/Camera remote connector or the 32 pin connector.

The following serial data is sent from the camera remote controller WV-CR12.

- VTR Playback control
- Date, Time, Subtitle display and editing
- Nega/Posi selection
- ATW/AWC selection
- Automatic Intermittent Recording control
- Auto Focus control
- Zoom control
- Pan/Tilt control
- Iris control
- R, B Gain control
- Standby/ON selection

The following serial data is sent from the Remote Control Unit (RCU) WV-RC35.

- CAMERA/COLOR BAR selection
- ATW/AWC selection
- Iris control
- Total Pedestal control
- R, B Gain control
- Tally

The serial clock pulse is supplied from the VTR or RCU to pin 11 (IRQ0) and pin 13 (P00) of IC4 to match the timing for data transmitting and receiving to/from VTR or RCU.

The serial clock pulse is supplied from the the camera remote controller to pin 60 (PB2/SBTB) of IC4.

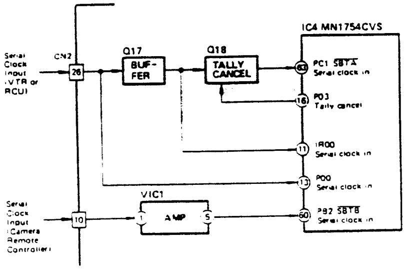


Fig. 6-3 Serial Clock Circuit

The serial data is fed from the VTR or RCU to pin 64 (PC2/SBIA) of IC4 so that the microprocessor identifies the instruction as from the VTR or RCU. The serial data is sent from pin 1 (PC3/SBIA) of IC4 to the VTR or RCU.

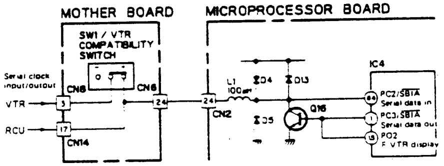


Fig. 6-4 Serial Data Circuit

The serial data is fed from camera remote controller to pin 61 (PB3/SBIB) of IC4 so that the microprocessor identifies the instruction as from the camera remote controller.

The character select circuit consisting of IC3 and IC4 controls the output characters for EVF video and PAL output.

When the character select signal which is supplied from pin 28 (P33) of IC4 to pin 23 (CS) is low (L), the character can be written into IC3. When character select signal is high (H), the character can not be written.

Standby detector Q19 detects whether the camera is ON or in standby.

When the camera standby switch is ON, a high level supplied from the Control board turns Q19 on and a low (L) level is fed to pin 58 (PB0) of IC4 so that the low level of power ON/OFF control obtained pin 27 (P32) turns Q4 on and +5V power is supplied to pin 24 of IC3.

When the standby switch is in standby, Q4 is turned off so that the power is not supplied to pin 24 of IC3.

o Character Generator

The clock pulse frequency of IC3 is adjusted by VR1 (CHARACTER SIZE).

The display characters consists of top and bottom portions. The display characters obtained at pins 5 (R OUT) and 8 (B OUT) are fed to the Process Board for PAL output and AF/Alarm mixing circuit for EVF display respectively.

The 4 bit input data supplied to pins 21 (A0), 20 (A1), 19 (A2) and 17 (A3) of IC3 is written when pin of 23 (CS) is set low (L) and a clock pulse is supplied to pin 22 (CK).

The output obtained pin 8 (B OUT) contains alarm (top portion) and the pin 5 (R OUT) contains title/date/time characters.

o D/A Output

The AWC (Automatic White Balance Control) R/B signal, Fade control signal, R/B GAIN signal, IRIS control signal and PED (Pedestal) signal obtained on output ports pins 33 (P50), 34 (P51), 35 (P52), 36 (P53), 37 (P60), 38 (P61) and 39 (P62) of IC4 are supplied to pin 3 (z) of multiplex IC7 through a digital/analog converter resistor block Z1 and buffer IC6 (a).

The output DC control voltage for AWC R, AWC B, Fade, R Gain, B Gain, Iris and Pedestal obtained on output pins 15, 1, 2, 14, 12, 5 and 4 respectively are fed to the Process Board and AIC control circuit.

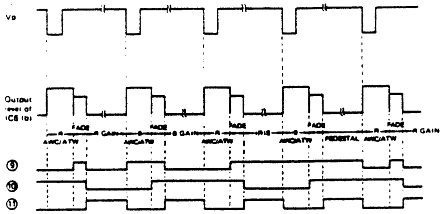


Fig. 6-5 D/A Output

o SES (Strobe Effect Shutter)

When the Strobe Effect Shutter/Normal Selection Switch SW1 is set to SES position, +4.8V is supplied to input matrix circuit and CCD drive pulse generator IC1 on the CCD Drive Board.

When +4.8V DC is supplied to pin 4 of IC2 (input matrix circuit), key scan output pin 24 (P23) of IC4 is connected to input pin 57 (PA3) and blinking character of SES is generated.

This +4.8V is also fed to pin 21 of CCD drive pulse generator IC1 on the CCD Drive Board and shutter mode pulse is supplied to CCD sensor.

o VTR Remote Control/Fade Control

When the VTR compatibility switch SW1 is set to the + (normal) position and the VTR is set in the recording mode if the power switch is turned ON, the potential at pin 17 of IC4 is set high and the REC character is not displayed in the viewfinder.

The high at p in 17 of IC4 (Microprocessor) is supplied to the base of Q5 so that Q5 turns ON. The low obtained at the collector of Q5 is supplied to the VTR through pin 6 of camera cable to set the VTR to the REC/PAUSE mode.

When the non-lock type VTR start/pause switch SW1 is depressed, the low (L) pulse is generated. The low at pin 17 of IC4 is fed to LQ5 and the high at the collector of Q5 is fed to the VTR to start recording.

At the same time, the REC character is generated and the blinking REC is displayed in the viewfinder.

When the subsequent trigger pulse is sent to pin 57 of IC4 by depressing SW1 again, the potential at pin 17 is inverted. As a result, the VTR is stopped and the blinking REC goes OFF.

The VTR compatibility switch SW1 inverts the potential of the VTR recording control signal at pin 1 of IC4 for other VTR which starts with low potential and stops with high potential.

Whenl the portable VTR is set to the playback mode, an inhibit (Tally) signal (high level) from the VTR is supplied to pin 63 of IC4 to inhibit the trigger pulse from the VTR start/pause switch SW1. Therefore, the REC character is not displayed in the viewfinder. This condition is mainntained until the playback mode is released and set to the recording mode again.

When the standby switch on the side of the camera is set to the standby mode, the high potential is fed to p in 58 of IC4 from the collector of Q19 for setting the potential at pin 6 of VTR connector low to pause the VTR.

Also the high potential at pin 18 (P11) of IC4 is supplied to pin 5 of the VTR connector through the Audio board to set the VTR to standby mode. The condition is maintained until the standby switch is reset to the ON position.

o Fade Control

• Fade-in effect

This circuit generates the fade control signal and sends it to the video signal processing circuit and Audio/lens control circuit to control the fade-in/out effects and also to the zebra signal generator circuit for cutting off the zebra signal.

When the VTR is in the recording mode, if the VTR start/pause switch is depressed after pressing the fade switch, the fade-out effect is obtained and the VTR pauses, then the picture appears again.

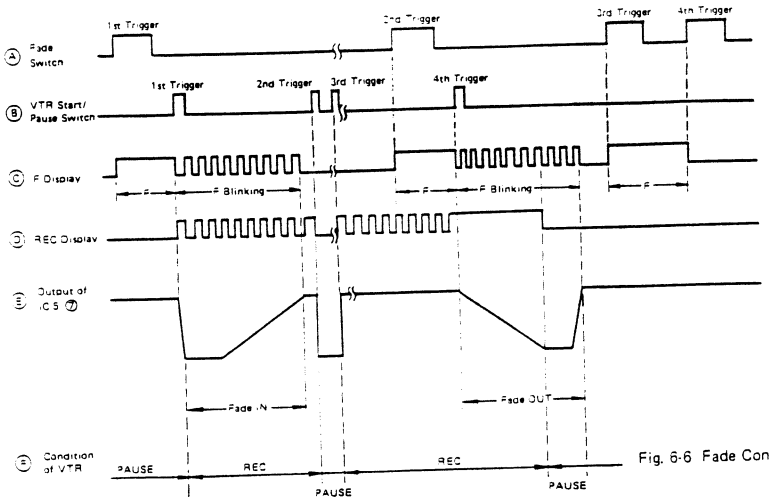


Fig. 6-6 Fade Control

If the VTR is in pause, depressing the VTR start/pause switch after pressing the fade switch, the video will fade out, the VTR starts recording and the video fades in again.

If the VTR start/pause switch is depressed without pressing the fade switch, no fade effect occurs and the VTR is remote-controlled as described in VTR remote control.

When the momentary fade switch SW7 is depressed (Ⓐ 1st trigger), the key scanning pulse output obtained pin 51 (P92) is connected to input port pin 56 (PA2) and the character F is displayed in the viewfinder. Then when the VTR start/pause switch SW1 is depressed (Ⓑ 1st trigger), the key scanning pulse output obtained pin 52 (P93) is connected to input port pin 57 (PA3) to display the blinking character REC in the viewfinder.

Simultaneously the DC level at pin 7 of IC5 decreases and increases gradually.

This DC level Ⓔ at pin 7 of IC5 is fed to the fade control circuit in the video signal processing circuit to control the video signal level.

This means that the VTR start/pause switch is pressed, the video signal is decreased rapidlyl at first and then appears again gradually (fade-in effect) after recording starts. Therefore the recording proceeds as shown Ⓔ.

When the fade-in effect is conpleted, the blinking F character goes OFF.

If the VTR start/pause switch SW1 is depressed independently after the fade-in effect is accomplished (Ⓑ, 2ND and 3RD TRIGGER), the VTR can be controlled remotely as previously described in VTR remote control.

If the fade switch SW7 is depressed again after it is initially pressed (Ⓐ, 3RD and 4TH TRIGGER), the initial setting for fade effect will be cancelled.

o Fade-out effect

As in the case of the fade-out effect, if the VTR start/pause switch SW1 is depressed (Ⓑ, 4TH TRIGGER) after pressing the fade switch SW7 (Ⓐ, 2ND TRIGGER), the DC level at pin 7 of IC5 starts decreasing gradually to fade-out the video.

When the VTR start/pause switch is pressed after depressing the fade switch, the picture disappears at first (fade-out effect), the VTR pauses and then the picture appears again gradually for next recording.

When the VTR stops, both the character REC and F disappears from the viewfinder.

When the portable VTR is set to the playback mode or the standby switch is set to the standby position, pin 58 of IC4 becomes high and the fade/rec control circuit is reset as described in VTR Remote Control Circuit.

Therefore the fade/rec control circuit is not controlled by depressing the VTR start/pause switch and the fade switch.

o Auto Tracing White-Balance (ATW) Circuit

This circuit automatically sets the white balance of the picture by tracing the change of white balance due to the color temperature variation when the white balance selection switch is set to the ATW position. Even if the camera is panned from the indoor to the outdoor or vice versa during the recording, the white balance is automatically changed by detecting the color temperature.

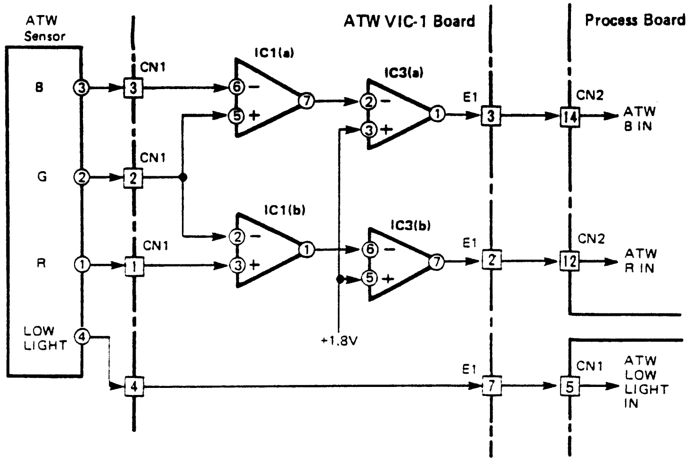


Fig. 6-7 ATW Sensor Circuit

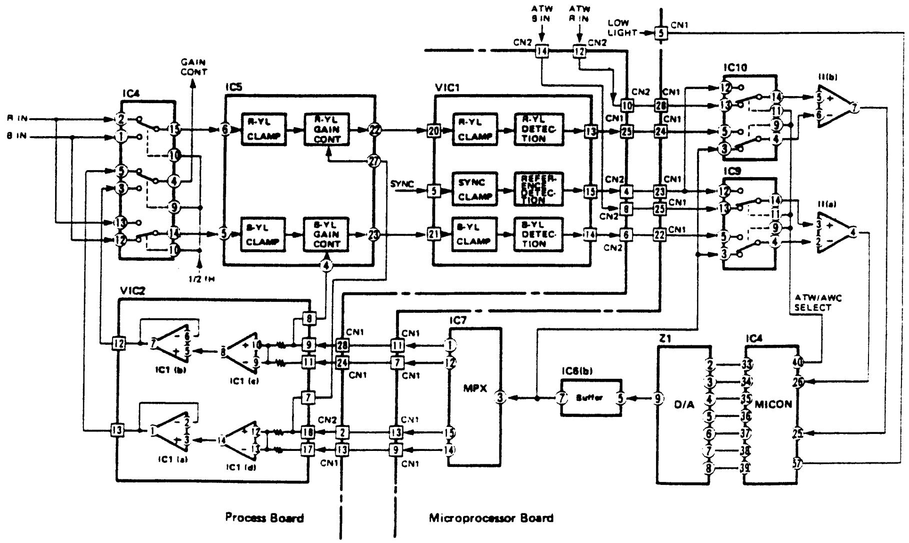


Fig. 6-8 ATW and AWC Circuit

The color temperature is detected by 3 front-mounted photo-diodes and the detected signal controls the red and blue signal amplitude in order to maintain the proper white balance of the picture. When the camera is shifted from indoor to outdoor for example, the red gain is increased and blue gain is decreased.

The operative range of auto tracing white-balance (ATW) is from about 2600°K to 6500°K. In order to prevent the misoperation of ATW in low light conditions, the ATW stops operating under approximately 3 footcandle (30 lux) at the photo-diode sensor.

The photo-diodes which are built into the auto tracing white-balance (ATW) sensor IC1 convert the intensity of red (R), green (G) and blue (B) light into DC voltages obtained at pins 1, 2 and 3 of IC1 respectively. The DC voltages from IC1 increase if the light intensity decreases.

The R, G and B DC voltages corresponding to the R, G and B light intensities are fed through CN1 to comparator/differential amplifier IC1 (a) and (b) and they are compared. The DC voltages at the output of IC1 (a) and (b) are then sent through amplifiers IC3 (b) and (a), E1 and CN2 to pin 13 of ATW/AWC select analog switch IC9 and IC10.

Before supplying to pin 13 of IC9, the DC voltage from IC3 (a) is inverted by amplifier inside IC5 in the Process board.

In IC1, the R DC voltage and the DC voltage set by VR1 (LOW LIGHT DETECT) are compared and a low level is obtained at pin 4 of IC1 in the normal lighting condition. It is sent through CN1, E1, CN1 and input matrix circuit pin 57 of microprocessor IC4. If the intensity of incoming light drops below approximately 3 footcandle (30 lux) at the sensor IC1, the output of comparison is changed from low to high level and pin 3 of IC9 and IC10 is connected to pin 5.

When the white balance selection switch on the side of camera is set to the ATW position, a high level is sent from the Microprocessor IC to control terminal (Pins 9 and 11) of IC9 and IC10. Pin 3 is connected to pin 4 and pin 13 is connected to pin 14. When set to the AWC position, the potential at pins 9 and 11 of IC9 and IC10 becomes low level, connecting pin 5 to pin 4 and pin 12 to pin 14.

When the white balance selection switch is set to the ATW position in the normal lighting condition, the DC voltages at pin 13 of IC9 and IC10 are sent through IC9/IC10 and pins 5/3 of IC11 to comparator IC11 and control the amplitude of R and B signals to obtain the proper white balance.

The gain controlled R and B signals are then applied to the R-Y_L and B-Y_L color difference signal circuits and the R-Y_L and B-Y_L signals in the Process board are sent to the video signal processing circuit to make the chrominance signal.

If the color temperature of the scene changes from 3200°K (indoor)to 5100°K (outdoor) for example, the DC voltage at pin 1 of IC1 increases and that at pin 3 decreases. These DC voltages are sent to IC1 and the DC voltage at pin 1 and pin 7 of IC2 increase respectively.

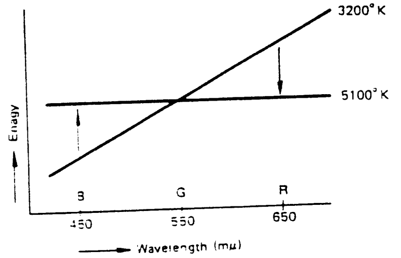


Fig. 6-9 Change of Color Temperature

The DC voltage at pin 1 of IC1 (a) is then fed through IC3 (b). Therefore the DC voltage supplied to R gain control amplifier decreases.

However, as the DC voltage at pin 7 of IC1 (b) is fed through IC3 (a) and amplifier IC5, the DC voltage fed to B gain control amplifier increases.

In this way, the amplitude of R signal is increased and that of B signal is decreased automatically to obtain proper white balance.

The changes of DC voltages detected by the photo-diodes do not correspond to that of the signal output from the CCD when the color temperature changes. In order to match both characteristics and to maintain the accurate white balance against color temperature variation, the DC voltage from amplifier IC3 is extended and suppressed.

The DC voltages which are set by VR2 (ATW R ADJ) and VR3 (ATW B ADJ) and fed through regulator IC2 (a) and IC2 (b) to IC1 (a) and IC1 (b) set the white balance at 3200°K color temperature.

When the white balance selection switch is set to the AWC position, the potential at pins 9 and 11 of IC9 and IC10 becomes low connecting pin 5 to pin 4 and pin 12 to pin 14. As a result, the DC voltage from the white balance setting circuit is sent to the gain control amplifier and the white balance is set.

o Automatic White Balance (AWC) Circuit

"Please refer to the microprocessor + process board schematic diagrams."

This circuit automatically sets the white balance of the picture by controlling the amplitude of the red and blue signals respectively when the white balance selections which is set to the AWC position and the white balance set switch is pressed. (Proper white balance or color balance means that the camera will reproduce a white object in the picture as white.)

When the ATW position is chosen, the automatic cycle in the camera keeps increasing or decreasing the R and B signals in step for white balance matching.

This is indicated by the character displayed in the viewfinder.

The blinking character WHITE will be displayed after the power switch is turned ON and while the white balance is being set. The blinking WHITE disappears when the automatic white balance process is finished.

When the white balance selection switch is set to the AWC position, if the power switch is turned ON, the negative reset pulse is generated in the +3V Regulator & Reset circuit. This reset pulse is fed to pin 2 of IC4 on the microprocessor board, and IC4 is reset.

IC4 outputs a 7 bit word from pins 33 ~ 39 which is converted into a DC voltage by Z1. This voltage is routed by IC7 through IC5C, D to CN1 pins 11, 13.... to set the initial gain of R and B signals respectively. As a result, the R and B signal levels are set and the camera will produce average white balance for 3200°K illumination when the power is first applied.

At this time, the blinking character WHITE is displayed on the viewfinder. When the character is displayed, the white balance should be set by depressing the white balance switch SW4 on the side of camera while aiming the camera at the white object or white paper.

When the set switch SW4 is depressed, pin 51d of IC4 is connected to pin 57, and the microprocessor starts counting up or down depending on the levels at pin 25 and pin 26 of IC4. As the counters count up or down the digital/analog (D/A) converter Z1 produces staircase signals.

The voltage levels from the multiplex IC7 will set the R and B gain.

These DC voltages are sent to the gain control circuits in IC5 on the Process board and control the R and B signal levels which were initially set for 3200°K illumination.

As the increasing or decreasing voltages made by the stairsteps raise the gain of the R and B channels, the levels of R-Y_L and B-Y_L signal increase or decrease at pins 22 and 233 of IC5.

To determine the counting direction, an Op-amp for each channel (IC11 pins 5, 6, 7 for red, pin 2, 3, 1 for blue) compares the detected signal levels (DC) which appear at VIC1 on the process board (pin 13 : R-Y_L detected DC, pin 14 : B-Y_L detected DC, pin 15 : reference detected DC).

The outputs of comparison at pin 7 and pin 1 of IC11 are sent to the microprocessor.

The output of comparator at pin 7 is high when the R signal level is below the Y_L signal (The R-Y_L detected DC level is below the reference detected DC level.) and the counter starts counting up.

The increased DC voltage from the D/A converter is fed to the red gain control circuit to increase the red signal level.

When the R signal just exceeds the Y_L signal, the comparator switches its output low and the counter starts counting down. The decreased DC voltage reduces the R signal level. The loop works until the R signal level is equal to the Y_L signal. The B channel works in a similar fashion.

The counters stop counting automatically about 3 seconds after set switch SW4 is depressed and white balance has been achieved.

At the same time, the blinking character WHITE goes OFF from the viewfinder.

When the white balance selection switch is set to the ATW position, analog switch IC9 and IC10 are connected to pins 3 and 13 and the white balance is controlled by the DC voltage supplied from the auto tracing white balance (ATW) circuit through IC9 and IC10.

6-2 Power Detect Circuit

o Back-up Battery Detect

IC13 (b) compares the +1.5V back-up battery voltage and the reference voltage divided +4.8V using R91 and R92.

When the back-up battery voltage is higher than 1.1V, the output voltage at pin 7 of IC13 is low (L). But the back-up battery is discharged and its voltage becomes lower than 1V, the output of IC13 changes high (H) and this is sent to input matrix circuit blink the "BACKUP" on the electronic viewfinder.

o +12V Detect

IC13 (a) compares the +12V and reference voltage divided +4.8V using R95 and R96.

When the +12V is higher than 10.6V, the output voltage at pin 1 of IC13 is low (L). But the +12V is becomes lower than 10.6V, the output of IC13 changes high (H) and this is sent to input matrix circuit to blink the "BATT" on the electronic viewfinder (EVF).

6-3 +3V Regulator & Reset Circuit

When the +12V DC power from the VTR or power supply unit is turned OFF, the back-up battery DC-DC converter oscillates at approx. 200 - 300KHz by Q21, C34, R83 and T1 and the stray capacitance using the +1.5V dry battery.

The boosted switching pulse obtained at pin 2 of T1 is rectified by D7 and converted it to +3V DC by C55.

This +3V DC is supplied to the microprocessor to maintain its calendar function when no +12V DC power is supplied.

However, the +3V DC voltage drifts according to the 1.5V back-up battery voltage. Therefore the voltage regulator Q22, D8, R85 and R86 controls the base bias voltage of Q21 to control the ON/OFF duty of Q21 to keep +3V DC voltage constant.

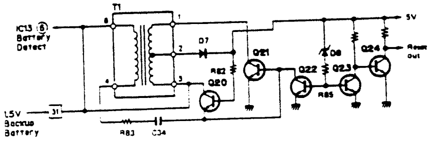


Fig. 6-10 +3V Regulator & Reset Circuit

On the other hand, when +12V DC is supplied to the camera, +5V or +3V DC is fed to D8 from the emitter of Q26 and D8 & Q22 are turned ON. The base of Q21 is connected to ground by Q22, Q21 is turned OFF and oscillation is stopped.

But, when no +12V DC is supplied to the camera and the +1.5V back-up battery is completely discharged, if a new +1.5V back-up battery is then installed, approx. 5 ~ 10 times more current flows to the microprocessor compared to normal back-up mode due to the microprocessor's characteristic. In this case, the back-up battery DC-DC converter circuit can not supply the +3V DC to the microprocessor because of small capacity of output current. Therefore, the base of Q20 is low and Q20 is turned OFF to stop the oscillation by cutting off the base bias voltage of Q21.

Q23 and Q24 generate the CPU reset pulse when the back-up battery is replaced and +12V DC power is then supplied to the camera. In this case, the microprocessor is reset by the CPU reset pulse. All information such as calendar, title automatic white balance (AWC) level etc. is cleared.

6-4 +5V Regulator Circuit

The reference +5V obtained at the emitter of Q25 is generated from +5V and this reference voltage is supplied to bases of +5V regulator Q26 and Q27.

When the +5V is supplied to pin 1 of IC14, a high (H) level obtained at pin 3 of IC14 is supplied to pin 59 (PB1) of IC4 for detection of power.

6-5 Automatic Iris Control Circuit

The AIC amplifier consists of IC8 (a) and IC8 (b).

The AIC detect signal is supplied from the Y signal processing circuit to pin 6 (-) of IC8 and amplified by IC8 (b).

Then it is sent from pin 7 of IC8 to the drive coil of the lens iris in order to open/close the lens iris.

The induced voltage (it occurs by moving the lens iris inside the damper coil.) is fed from the lens damper coil to pin 3 (+) of IC8 and amplified by IC8 (a). Then the amplified signal is fed from pin 1 of IC8 to pin 6 of IC8 to damp the lens iris hunting.

The AIC level is controlled by VR2 (AIC LEVEL).

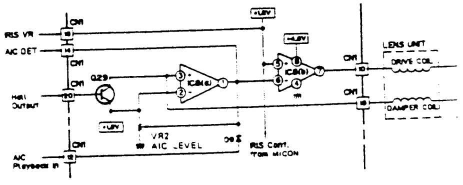


Fig. 6-11 AIC Amplifier Circuit

6-6 Zoom Control Circuit

When the TELE switch SW3 on the grip shoulder is depressed the base of Q35 is connected to +4.8V and turns ON Q35, Q36 and Q32. Therefore, the current flows into the zoom motor through Q32 and Q36 for zoom-in (telephoto) operation.

When the WIDE switch SW2 is depressed, Q38, Q37 and Q33 turn ON. Therefore, the current flows into the zoom motor (in the reverse direction) through Q33 and Q37 for zoom-out (wide angle) operation.

SW4 and SW5 are zoom speed control switches to increase the zoom speed by changing the DC voltage at the both bases of Q36 and Q37.

When the camera remote controller is connected with the camera, zoom speed control is supplied from the microprocessor to the bases of Q34 and Q31 through D10 and TELE/WIDE control is supplied from microprocessor to the bases of Q35 and Q38 through D11/D12 and IC12.

6-7 AF/Character Mixing Circuit

This circuit receives the L/V video control signal, AF area signal and character signal and supplies the mixed AF area and character signals to the EVF.

When the AF area signal and character signal are supplied to the base of Q13, they are mixed and then supplied to the EVF.

When the high (H) level of L/V video control signal is supplied to the base of Q14, Q14 turns ON and cuts off the AF area and character signals.

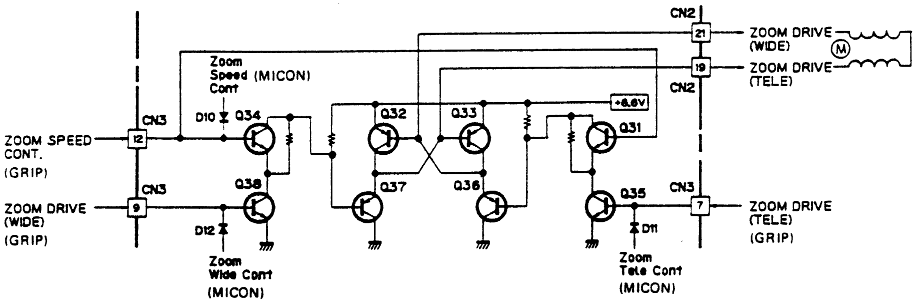

CN2
21
ZOOM DRIVE
(WIDE)
M
19
ZOOM DRIVE
(TELE)
CN2
Zoom
Speed (MICON)
Cont
+4.8V
CN3
D10
Q34
Q32
Q33
Q31
ZOOM SPEED
CONT.
(GRIP)
12
CN3
Q38
Q37
Q36
Q35
CN3
ZOOM DRIVE
(WIDE)
(GRIP)
9
D12
D11
7
ZOOM DRIVE
(TELE)
(GRIP)
Zoom
Wide Cont
(MICON)
Zoom
Tele Cont
(MICON)

Fig. 6-12 Zoom Control Circuit

7. Auto Focus Board

Outline

This model utilizes a Sharpness Detection Auto Focus lens which adjusts the lens focus to obtain the sharpest picture using the video signal from the CCD image sensor. The amplitude of the high frequency components in the video signal are maximized at an in-focus lens position, and reduced at an out-of-focus position as shown in Figure 7-1.

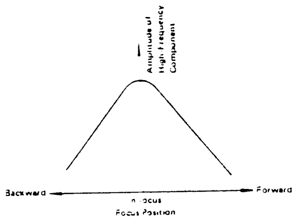


Fig. 7-1 Amplitude of High-Frequency Component

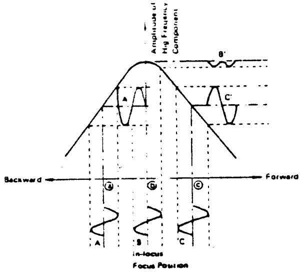


Fig. 7-2 Light-Pass Length Modulation

Varying the position of the lens element in relation to the surface of the CCD chip will vary the amplitude of the high frequency components in the video signal. Therefore, if the lens element is varied according to a specific reference cycle, the high frequency components will be AM modulated by the reference cycle. This will be explained in more detail.

Figure 7-2 shows three different cases of the effects of varying the lens element position on the amplitude of the high frequency components. Figure A shows the lens starting from an out-of-focus position, being too close to the CCD element. As the lens element is extended away from the CCD toward the in-focus position, the amplitude of the high frequency components increases. As the lens element is retracted back toward the CCD, the component amplitude decreases. This yields waveform A'.

Figure C is the same except that the lens element starts from an out of focus position extended away from the CCD. The same cycling of the element occurs, extension and retraction but with the opposite effect. Waveform A' and C' are similar, but 180° out of phase. When the lens element is in focus, extension and retraction both produce a decrease in the high frequency component amplitude producing a different phasing. The amplitude swings are also much smaller. (Figure. B') The microcomputer uses this phase and amplitude information to determine and correct the lens position the amplitude indicates the distance from the optimum focus point and the phase indicates the relative starting position. The focus motor is then driven in the proper direction to achieve optimum focus.

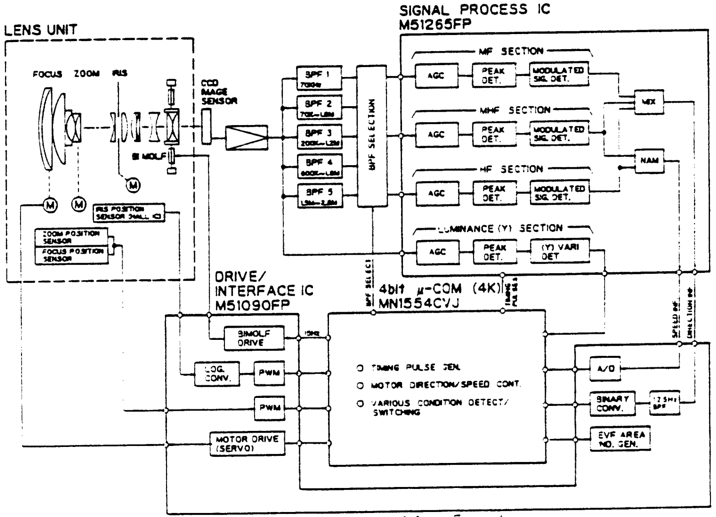

SIGNAL PROCESS IC
M51265FP
LENS UNIT
FOCUS
ZOOM
IRIS
CCD
IMAGE
SENSOR
BIMOLF
M
M
M
IRIS POSITION SENSOR (HALL IC)
ZOOM POSITION SENSOR
FOCUS POSITION SENSOR
BPF 1
BPF 2
BPF 3
BPF 4
BPF 5
BPF SELECTION
MF SECTION
MHF SECTION
HF SECTION
LUMINANCE (Y) SECTION
AGC
PEAK DET.
MODULATED SIG. DET.
(Y) VARI DET
MIX
NAM
DRIVE/
INTERFACE IC
M51090FP
BPF SELECT
4bit μ-COM (4K)
MN1554CVJ
SPEED INF.
DIRECTION INF.
BIMOLF DRIVE
15Hz
LOG. CONV.
PWM
PWM
MOTOR DRIVE (SERVO)
TIMING PULSE GEN.
MOTOR DIRECTION/SPEED CONT.
VARIOUS CONDITION DETECT/ SWITCHING
A/D
BINARY CONV.
12.5Hz BPF
EVF AREA NO. GEN.

Fig. 7-3 Block Diagram of Auto Focus Lens

Details

Please refer to the schematic diagram, and figure 7-3.

A 50 Hz V pulse is fed to IC3 pin 4, and divided down to 12.5Hz. This pulse is used by the detectors in IC3, as well as being output on pin 62 to the balanced modulator in IC2.

Clamp pulse CP2 is applied to pin 18 of IC2, converted into a sawtooth, shaped, and applied to the same balanced modulator. The H pulse, now modulated by the 12.5 Hz waveform is sent from pin 7 to the step up transformer T1. Q12 & Q13 are used as detectors to remove the modulated horizontal pulse component, leaving a 12.5 Hz sine wave of high amplitude at the secondary.

This sine wave is connected to the Piezo-electric vibration element which moves the master lens back and forth 12.5 times per second, which causes the high frequency components in the video signal to be AM modulated, as discussed previously.

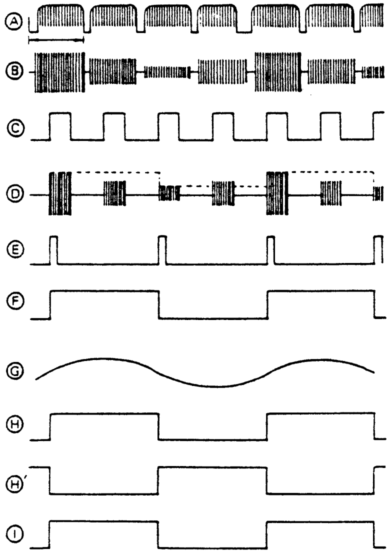


Fig. 7-4

The video signal from the preamp ("A" - shown at the V rate), is applied to IC1 pin 40. It is clamped by CP1, (from IC1 pin 38), and output via pin 42 to the 5 Band Pass Filters FL1, FL2, & R2,R4,C1andC72, which pass 2.05Mhz (VHF),1.25Khz (HF), 630KHz (MHF), 600Khz (MF).& 70Khz (LF) The appropriate combination of frequencies is determined by IC3 (as will be explained later), which switches IC4 and IC5 accordingly. The selected combinations are input to IC1 on pins 48 & 12, as well as VHF to pin 47, and MHF to pin 25. Note that there are 3 almost identical paths through IC1 for the different frequencies. Waveform B shows one of the 5 frequencies after AGC and detection, which is AM modulated by the 12.5Hz sine wave (4 fields/cycle).

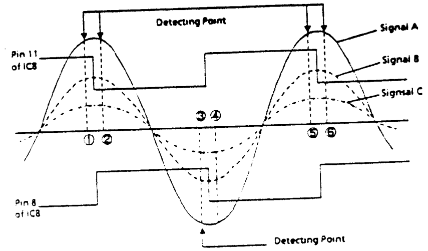
A gating pulse (C), from pin 38 of IC1, passes the center portion of each interval of (B). The result is Waveform (D). This signal is then applied to the peak hold and sample & hold stages, which are activated by signal (E), derived from the input to IC1 pin 24.

The pulse (F) which appears on pin 23, containing the MF frequency information is fed through a 12.5Hz BPF consisting of R42-R44, VR5, and C45-C46, which removes any noise components which may cause misoperation. The resultant 12.5 Hz sine wave (G) is sent to IC3 pin 32 to the A/D converter which yields pulse (H).

A similar pulse (F) which contains the summed information of several frequencies appears at pin 7 and is filtered by R45-R47, & C47-C48. The resultant waveform (G) is sent to IC2 pin 37, to another A/D converter, yielding a similar pulse (H). These two (H) pulses are output from pins 34 & 35 to the detectors previously mentioned, which form the Focus Position Control. This section determines on which side of optimum focus the lens lies, and drives the focus motor in the proper direction.

As was explained in Figure 7-2, waveforms of 180 degree difference will be generated depending on the initial lens position relative to the center (optimum) focus point. Waveform (H) is developed on the "backward" (too close) side, and (H') is developed if the lens is initially positioned on the "forward" (too far from CCD) side of the center point. These waveforms are phase compared with the 12.5Hz reference pulse (I) to make the determination.

Another pulse (F) from IC1 pin 11, containing the HF information is similarly filtered by 12.5Hz BPF IC7(b), R86-R89 & C66-C67 to remove spurious noise, and sent to comparator IC8(c), (d). Here it is compared with reference pulses as shown in Fig. 7-4, and the difference between the present focus position and the in-focus position is converted into a digital signal which is sent to IC3 pin 37, to govern the speed of the focus motor.



	①	②	③	④	⑤	⑥
Signal A	L	L	L	L	L	L
Signal B	H	L	L	H	H	L
Signal C	H	H	H	H	H	H

Fig. 7-5 Infocus Detection

The MF frequency waveform on pins 32-33 of IC1 is also sent to comparator IC6(a), (b) and compared to the reference voltages. The output is sent to IC3 pin 38. The HF signal on pin 37 has precedence in determining the focus motor speed, but if these frequencies are not present in the video signal, then the MF signal on pin 38 is used.

The signals for rotation direction to the focus motor are output on pins 20 & 21 of IC3, and the speed setting is output on pins 23, 24, & 28. These signals are sent to IC2, and the motor is driven by a voltage from pin 50 and pin 2.

The current focus and zoom positions are converted to corresponding values of resistance by their respective potentiometers. These values are sampled alternately by Q10 and Q11, into pin 23 of IC2.

The voltages from the focus and zoom positions pots are converted into Pulse width modulated signals by IC2 pins 23, 24, which are then sent to IC3 and the Direction/Stop Control block.

The zoom information controls the BPF selection.

The current focus position is memorized in the microprocessor, after it has been determined by the circuit. If an object is then shot which has no high frequency components, such as a flat field, the focus ring will be driven from the infinity position to the 1 meter position once (SEARCH), then returned to the previously memorized position if no high frequency components have been detected. The focus position endpoints are used to reverse the direction of the motor when necessary.

The microprocessor, IC3, selects the appropriate frequency components by means of switch IC4 and IC5, through pins.14-18. The best combination of frequencies is determined by several factors, such as (Refer to Fig. 7-6);

		(T-W)							
		0 (TELE)	1	2	3	4	5	6 (WIDE)	7 (MACRO)
LOW LIGHT	0	00	00	00	0A	08	08	08	1F
	1	00	00	0A	0A	08	08	08	1F
	2 0	0A	0A	03	03	14	14	14	1F
(OPEN)	1	0A	03	03	14	14	14	15	1F
F-VALUE	2	0A	03	14	14	14	16	16	1F
	3	03	08	14	14	16	16	16	1F
	4	08	14	14	16	16	16	1F	1F
	5	14	14	14	16	16	1F	1F	1F
	6	14	14	16	16	1F	1F	1F	1F
(CLOSE)	7	14	16	16	1F	1F	1F	1F	1F

1F : Zone Focus is applied (Auto focus is disabled)

Fig. 7-6 B.P.F Selection Control Table

(a) LENS IRIS OPENING (f stop):The Hall sensor detects the current f stop and relays this information to IC8. If the f number is low, which creates a narrow depth of field. Therefore, lower frequencies are selected in the beginning. As the iris closes, the depth of field widens, and higher frequencies must be selected from the beginning since video signal contains high frequency. If the f stop is 16 or higher, the AF circuit is disabled, and ZONE FOCUS must be used.

(b) ZOOM POSITION :For a wide angle shot, the depth of field is wide, and higher frequencies are selected. As lens is zoomed in to the TELE position, the depth of field narrows, and lower frequencies must be used. If the MACRO setting is used, the AF circuit is disabled.

(c) LOW LIGHT :Under normal illumination, the higher frequencies are selected, but as illumination decreases, the high frequency components in the video decrease, so the lower filters are switched in.

The gated and rectified signal is peak held in each vertical period by the peak hold (P/H) block. However it is not complete peak holding but a certain time constant of integration is applied. **The peak held signal is then sampled/held (S/H) in every 2 vertical period twice (SH_1, SH_2) and the difference of the two S/H outputs is taken out in order to separate (detect) the modulated V/4 period (12.5Hz)** signal.

2-2-2 Fluorescent Lamp Correction Block

When the AC line frequency and vertical frequency of TV system is different (AC : 60Hz, TV :PAL : 50Hz), the video signal may have flicker (10Hz). This flicker disturbs the V/4 (12.5Hz) signal and causes misoperation.. To eliminate this flicker, two more sample/hold circuits (SH_3, SH_4) are built-in.
The lighting condition (Fluorescent or incandescent light) is detected in the Y.VARI.DET block in the IC1 (M51265FP) and this information is fed to the microprocessor (MN1554CVJ) for discrimination of fluorescent light.
The microprocessor controls the sample/hold (SH) pulse and SH_3 and SH_4 are used for sampling under fluorescent light conditions.

2-2-3 Pulse Timing

Pulse timing of the reset pulse for peak-hold sampling pulse for sample/hold (RST, SH_1 ~ SH_5) and gate pulse are shown in Fig. 7-9 (Pin 45 ~ 47 of IC3).
IC1 (M51265FP) **receives 6 mixed pulses (RST, SH_1 ~ SH_5) and separates them.**
The gate pulse is also fed to IC1 mixed with the clamp pulse CP1.
The SH_5 pulse occurs once 6 vertical periods and is used by the luminance section for the detection of the flicker of fluorescent **lights.**

2-2-4 Output Block

The following output signals are provided from IC2 (M51265FP).

a) Encoder output A, B
b) Mixed modulated signal output
c) MF modulated signal output
d) HF modulated signal output
e) NAM output

a) Encoder output A, B

These outputs are binary coded digital signals and contain the absolute level of MF and HF signals and luminance variation information.
These outputs are connected to the microprocessor directly and are used for discrimination of the condition (Refer to Fig. 7-9 pin 33 and 34 of IC3).

b) Mixed modulated signal output

This output is used for discrimination of the direction in the HF condition (described later). The reason for using the mixed 3 channels (HF, MHF, MF) signal is to prevent misoperation for various objects. The direction is decided by the majority of the 3 (HF, MHF, MF).

c) MF modulated signal output

This output is used for discrimination and direction under the MF condition.

d) HF modulated signal output

This output is used for discrimination in the HF condition and **in-focus condition.**

e) NAM output

This output is used to control the focus motor speed. **The MHF and HF modulated signal are non additive mixed (NAM) for speed control of focus motor.**
In the MF condition, the focus motor is driven by the **maximum speed.**
When the condition just enters the HF condition (i.e., HF modulation signal level just exceeds a certain level), the focus motor is switched to be driven by referring to the level of the HF modulated signal.
However, the level of the HF modulated signal is not very high at first, and the MF modulated signal level is dropping. Therefore, the MHF modulated signal is used to compensate during this period and the NAM circuit is used for this purpose.
This NAM output is converted into a digital signal in IC2 and fed to the microprocessor.

2-3 Control Block (MN1554CVJ)

This TTL autofocus system is controlled by the microprocessor MN1554CVJ. (Refer to Fig. 7-9 and Fig. 7-10)

2-3-1 Functions

Main Function

a) Control pulse generation :
  - o Vp/4 (Bimolf drive)
  - o Gate pulse (V.gate, V.gate frame)
  - o Sample hold pulse (S/H_1 ~ S/H_5)
  - o Peak hold reset pulse (RST)

b) Condition discrimination :
  LF, MF, HF condition and in-focus (Described later)

c) **Focus motor control :**
  Direction control and speed control depending on the **condition**

d) **Bimolf drive control :**
  Drive level control depending on the F stop (Iris opening : Depth of field)

e) **BPF selection :**
  Select BPF depending on the zoom position and F stop (Iris opening)

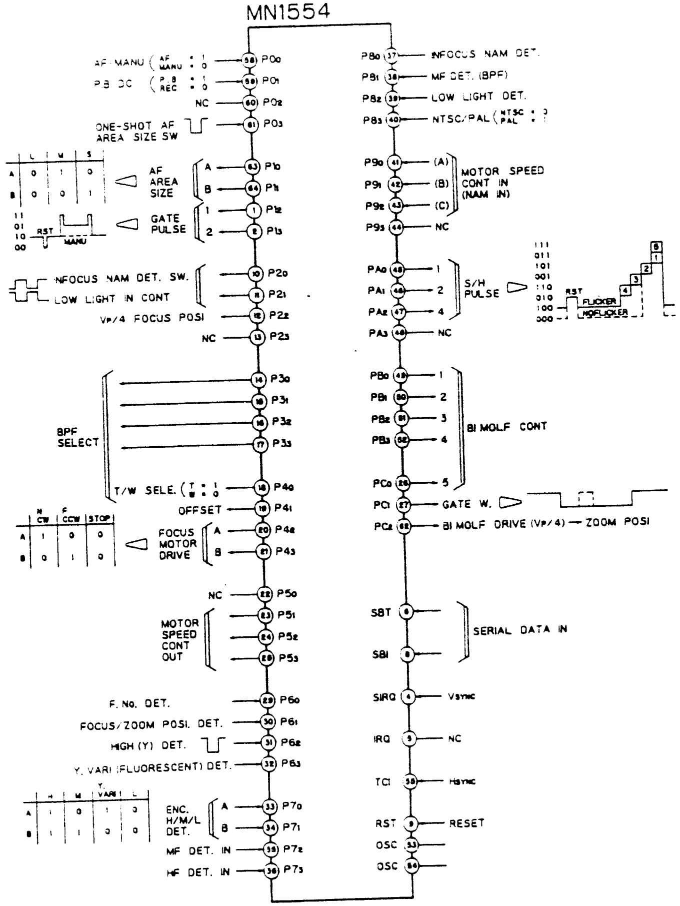

MN1554
AF MANU (AF : 1, MANU : 0) — 58 P0₀
P.B DC (P.B : 1, REC : 0) — 59 P0₁
NC — 60 P0₂
ONE-SHOT AF AREA SIZE SW — 61 P0₃
L M S
A 0 1 0
B 0 0 1
AF AREA SIZE A — 63 P1₀, B — 64 P1₁
GATE PULSE 1 — 1 P1₂, 2 — 2 P1₃
11 01 10 00 RST MANU
INFOCUS NAM DET. SW. — 10 P2₀
LOW LIGHT IN CONT — 11 P2₁
Vp/4 FOCUS POSI — 12 P2₂
NC — 13 P2₃
BPF SELECT — 14 P3₀, 15 P3₁, 16 P3₂, 17 P3₃
T/W SELE. (T : 1, W : 0) — 18 P4₀
OFFSET — 19 P4₁
N CW, F CCW, STOP
A 1 0 0
B 0 1 0
FOCUS MOTOR DRIVE A — 20 P4₂, B — 21 P4₃
NC — 22 P5₀
MOTOR SPEED CONT OUT — 23 P5₁, 24 P5₂, 25 P5₃
F. No. DET. — 29 P6₀
FOCUS/ZOOM POSI. DET. — 30 P6₁
HIGH (Y) DET. — 31 P6₂
Y. VARI (FLUORESCENT) DET. — 32 P6₃
H M Y.VARI L
A 1 0 1 0
B 1 1 0 0
ENC. H/M/L DET. A — 33 P7₀, B — 34 P7₁
MF DET. IN — 35 P7₂
HF DET. IN — 36 P7₃
P8₀ 37 — INFOCUS NAM DET.
P8₁ 38 — MF DET. (BPF)
P8₂ 39 — LOW LIGHT DET.
P8₃ 40 — NTSC/PAL (NTSC : 0, PAL : 1)
P9₀ 41 — (A), P9₁ 42 — (B), P9₂ 43 — (C) MOTOR SPEED CONT IN (NAM IN)
P9₃ 44 — NC
PA₀ 45 — 1, PA₁ 46 — 2, PA₂ 47 — 4 S/H PULSE
111 011 101 001 110 010 100 000
RST FLICKER NOFLICKER 4 3 2 1 5
PA₃ 48 — NC
PB₀ 49 — 1, PB₁ 50 — 2, PB₂ 51 — 3, PB₃ 52 — 4, PC₀ 26 — 5 BI MOLF CONT
PC₁ 27 — GATE W.
PC₂ 62 — BI MOLF DRIVE (Vp/4) → ZOOM POSI
SBT 6, SBI 8 SERIAL DATA IN
SIRQ 4 — VSYNC
IRQ 5 — NC
TCI 55 — HSYNC
RST 9 — RESET
OSC 53
OSC 54

Fig. 7-9 Pin Identification of IC3

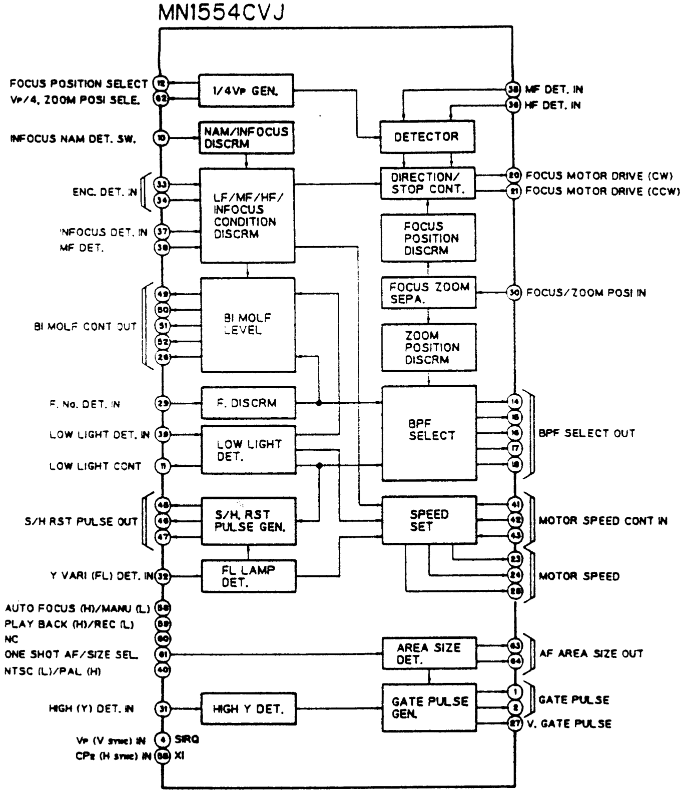

MN1554CVJ
FOCUS POSITION SELECT
VP/4, ZOOM POSI SELE.
INFOCUS NAM DET. SW.
ENC. DET. IN
INFOCUS DET. IN
MF DET.
BI MOLF CONT OUT
F. No. DET. IN
LOW LIGHT DET. IN
LOW LIGHT CONT
S/H RST PULSE OUT
Y VARI (FL) DET. IN
AUTO FOCUS (H)/MANU (L)
PLAY BACK (H)/REC (L)
NC
ONE SHOT AF/SIZE SEL.
NTSC (L)/PAL (H)
HIGH (Y) DET. IN
VP (V sync) IN
CP2 (H sync) IN
SIRQ
XI
1/4VP GEN.
NAM/INFOCUS DISCRM
LF/MF/HF/ INFOCUS CONDITION DISCRM
BI MOLF LEVEL
F. DISCRM
LOW LIGHT DET.
S/H, RST PULSE GEN.
FL LAMP DET.
HIGH Y DET.
DETECTOR
DIRECTION/ STOP CONT.
FOCUS POSITION DISCRM
FOCUS ZOOM SEPA.
ZOOM POSITION DISCRM
BPF SELECT
SPEED SET
AREA SIZE DET.
GATE PULSE GEN.
MF DET. IN
HF DET. IN
FOCUS MOTOR DRIVE (CW)
FOCUS MOTOR DRIVE (CCW)
FOCUS/ZOOM POSI IN
BPF SELECT OUT
MOTOR SPEED CONT IN
MOTOR SPEED
AF AREA SIZE OUT
GATE PULSE
V. GATE PULSE

Fig. 7-10 Block Diagram of IC3

Sub Function

a) Low light detection :
   Reduce motor speed and blink the EVF area indicator

b) High light (High Y) detection :
   Separate the gate high light portion

c) Fluorescent light detection :
   Generate sample hold pulse SH_3, SH4 for compensation

d) MACRO condition detection :
   Disable AF function in the MACRO mode

e) Playback detection :
   Disable AF function in the playback mode

f) Area size switching :
   Switching M — S — L size

2-3-2 Outline of Processing

The microprocessor controls the processing in the following 3 ways depending on the focusing condition.

a) Low frequency (LF) process :

Condition :	The picture is absolutely blurred and it is impossible to discriminate the direction.
Process :	Search the focus ring allover the range once.

b) Middle frequency (MF) process :

Condition :	Rough discrimination of the direction is possible.
Process :	Drive the focus motor using the information from the MF section. Drive speed is basically maximum.

c) High frequency (HF) process :

Condition :	The focusing is close to the in-focus position.
Process :	Control the motor speed by referring to the NAM output under enough HF output level condition and stop it at the in-focus position.

The above discrimination is performed by using the encoder output of IC1 (M51265FP), MF and HF modulated signal level. Additionally, the following controls are performed by the camera remote controller WV-CR12 by serial data control.

- o Focus Auto/Manual selection
- o One shot AF or size selection
- o Power focus control
- o Power focus speed selection

2-4 Drive/Interface Block (M51090FP)

The block diagram of M51090FP is shown in Fig.7-11. This IC consists of the following 7 blocks.

a) Motor driver
b) Bimolf driver
c) Iris position input
d) Focus/zoom position input
e) H..gate, EVF area frame generator
f) A/D converter
g) Operational amplifiers and comparators

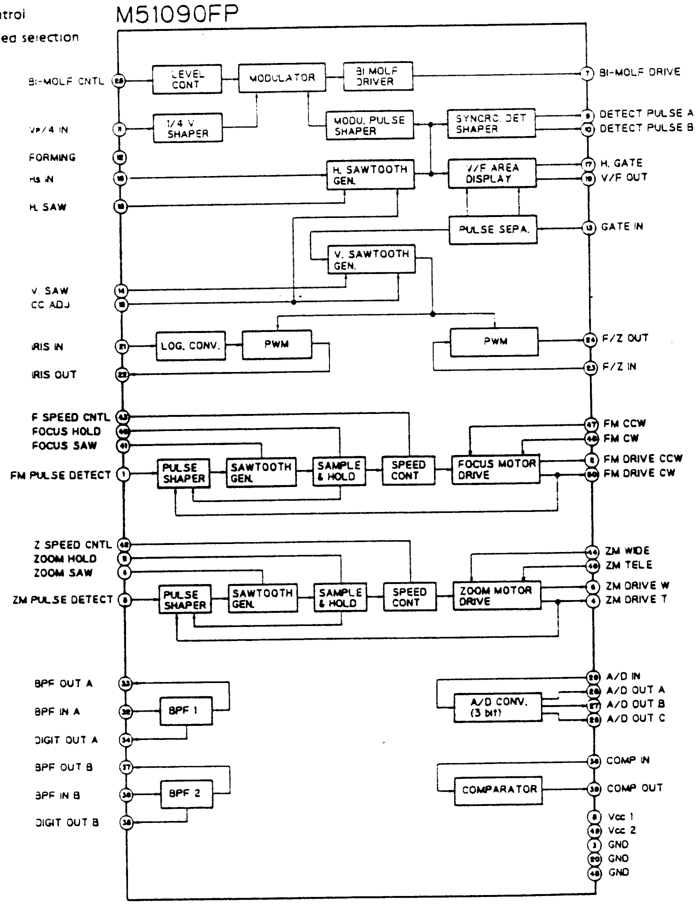

M51090FP
BI-MOLF CNTL
VP/4 IN
FORMING
HS IN
H. SAW
V. SAW
CC ADJ
IRIS IN
IRIS OUT
F SPEED CNTL
FOCUS HOLD
FOCUS SAW
FM PULSE DETECT
Z SPEED CNTL
ZOOM HOLD
ZOOM SAW
ZM PULSE DETECT
BPF OUT A
BPF IN A
DIGIT OUT A
BPF OUT B
BPF IN B
DIGIT OUT B
LEVEL CONT
MODULATOR
BI MOLF DRIVER
1/4 V SHAPER
MODU. PULSE SHAPER
SYNCRO DET SHAPER
H. SAWTOOTH GEN.
V/F AREA DISPLAY
PULSE SEPA.
V. SAWTOOTH GEN.
LOG. CONV.
PWM
PWM
PULSE SHAPER
SAWTOOTH GEN.
SAMPLE & HOLD
SPEED CONT
FOCUS MOTOR DRIVE
ZOOM MOTOR DRIVE
BPF 1
BPF 2
A/D CONV. (3 bit)
COMPARATOR
BI-MOLF DRIVE
DETECT PULSE A
DETECT PULSE B
H. GATE
V/F OUT
GATE IN
F/Z OUT
F/Z IN
FM CCW
FM CW
FM DRIVE CCW
FM DRIVE CW
ZM WIDE
ZM TELE
ZM DRIVE W
ZM DRIVE T
A/D IN
A/D OUT A
A/D OUT B
A/D OUT C
COMP IN
COMP OUT
Vcc 1
Vcc 2
GND
GND
GND

Fig. 7-11 Block Diagram of IC2

2-4-1 Motor Driver

This block has a servo control function to enable constant speed control.
This servo control circuit detects the speed information by detecting the pulse generated by the commutator of the focus motor.

a) Pulse Detection Block
A LC resonance circuit (fo = 33KHz) is inserted in series with the focus motor and the pulse obtained at both ends of the LC circuit is detected and rectified.

b) F/V (Frequency to Voltage) convertor
This block converts the frequency of the detected pulses to a voltage and consists of a sawtooth generator and a sample hold circuit.

c) Speed Controller
This block controls the drive voltage for the focus motor using the result of comparison of control voltage supplied from microprocessor and the F/V converted voltage.

2-4-2 Bimolf Driver

Approximately 150Vp-p sine wave drive voltage is required for the bimolf drive.
M51090FP has following blocks.

a) Waveform Shaper :
The Vp/4 square pulse (Duty : 50%) fed from the microprocessor is converted into a sine wave.

b) Balanced Modulator :
The Vp/4 sine wave is chopped by the horizontal pulse to be mixed in this block.

c) Gain Control Block :
Since the efficiency of the bimolf differs among the units due to manufacturing tolerance , the drive voltage is set by VRs (VR3 and VR4) to set the initial value of amplitude and control gain.

d) Synchronous Detection Pulse Generator :
This block [illegible]nerates the pulse for discriminating the envelope c[illegible]e chopped drive output.
Two polarity (Positive and Negative) pulses are generated in order to simplify the discrimination circuit.

2-4-3 Iris Position Input

A hall sensor IC is built-in the iris drive coil block in the lens in order to detect the iris opening (F stop) and the voltage corresponding to the iris opening is provided. This output voltage varies as an exponential function against F stop (F number) so that the output voltage is converted into a linear scale against the F stop by a logarithmic convertor and pulse width modulated to be sent to the microprocessor.

2-4-4 Focus/Zoom Position Input

The focus and zoom position information can be obtained by the potentiometers which are moved corresponding to the focus or zoom ring of the lens.
This output voltage is pulse width modulated to be applied to the microprocessor.
The focus and zoom voltage is switched alternately every 2 vertical periods outside of IC (Q10 and Q11). The switching pulses are fed from the microprocessor.

2-4-5 H.gate, EVF Area Frame Generator

The horizontal gate pulse to decide the measuring area and EVF area frame signal is generated in this block.
The gate size can be changed by the DC voltage mixed together with Hs (CP_2) pulse.

2-4-6 A/D Convertor

This block is used to give NAM information access to microprocessor.
This input voltage range is from 3.5V to 4.2V and the output is not a binary code but a gray code.

2-4-7 Operational Amplifiers (OP AMP)& Comparators

There are 2 pairs of OP amps ;and comparators are built-in.
These OP amps conform an active band pass filter (Vp/4 : PAL = 12.5Hz) and their outputs are converted into a digital signal by comparators and sent to microprocessor for discrimination of the direction of motor drive.

8. Audio Board

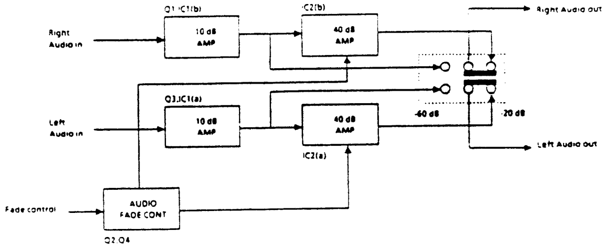


Fig. 8-1 Audio Circuit

This circuit amplifies the output from the mounted microphone or external microphones.
The amplified audio signal is sent out to the VTR for recording and to the earphone jack on the camera for audio monitoring.
The −70dB output for channel-1 (left) or channel-2 (right) from the electret condenser microphone (which is mounted on the camera), or one/two external microphone(s) is/are supplied to audio amplifier consisting of Q1, Q3, IC1 and IC2 respectively where it/they is/are amplified +50dB.
The −20dB audio output at pins 1 (CH1) and 7 (CH2) of IC2 are sent to SW1 (AUDIO LEVEL SECTION SWITCH).
The −60dB audio output at pins 1 (CH1) and 7 (CH2) of IC1 are sent to SW1.
SW1 selects the −20dB or −60dB audio signal and the selected signals (CH1 and CH2) are sent to the portable VTR through pin 8 (CH1) and 9 (CH2) of CN3 and the 10pin connector.
The −20dB audio signal pin 1 (CH1) and 7 (CH2) of IC2 are also fed to D2 and D1 where they are converted into DC voltages. The rectified DC voltages are supplied to the base of Q3 and Q1 to control the resistance between the collector and emitter of Q3 and Q1.
When the audio signal level at pin 1 and 7 of IC2 increases, the DC voltage at the base of Q3 and Q1 also increases and resistance between collector and emitter decreases. Therefore, the audio level at pins 3 and 5 of IC1 decreases.
When the audio signal level at pin 1 and 7 of IC2 decreases, the reverse operation takes place.
In this way, the audio signal output level is kept constant.
The audio signal level is also controlled by the fade control signal supplied from the Microprocessor board through pin 2 of CN3 and Q4 and Q2.
The −20dB audio signals (CH1 and CH2) are also fed to the earphone jack through amplifier IC3.
The stand by control signal from the Microprocessor board is supplied to the stand-by control Q9 and Q8 through pin 11 of CN3 and the stand by control signal obtained at the collector of Q8 is fed to the portable VTR.
The INT/EXT control signal is fed from the Power/Sync board to the Microprocessor board through buffer Q7/Q6. The tally control signal from the Microprocessor board is supplied to the base of Q5 and the zebra/Vp mixed signal from the Power/Sync board is supplied to the emitter of Q5. The tally control signal obtained at the emitter of Q5 is mixed with the zebra/Vp mixed signal. The mixed signal is fed to the view finder.
SW4 (DC POWER SELECTION SWITCH) selects the camera power as;

VTR : +12V is fed from 10 pin VTR connector
EXT : +12V is fed from 32 pin connector

VR1 (R GAIN) controls the for color balance of red signal gain
VR2 (B GAIN) controls the for color balance of blue signa gain.

9. Electronic Viewfinder
(WV-VF01)

9-1 EVF Video Amplifier Circuit

This circuit amplifies the video signal supplied from the Power/Sync board and feeds it to the cathode ray tube (CRT together with the level indicator signal which indicates the character signal generated in the Microprocessor board fo graphics display on the CRT screen.
The video signal from the Power/Sync board is applied to the base of amplifier Q2 in the EVF VIC board. The amplifie video signal at the emitter of Q2 is sent to pin 18 of IC2. The video signal is clamped and amplified inside IC2 then mixe with the character signal.
The mixed signal obtained at pin 24 of IC2 is supplied to gri 1 (G1) of the CRT through VR5 (CONTRAST) and amplifier Q3 The G1 DC voltage is set by VR6 (BRIGHTNESS). The characte signal from the Microprocessor board is supplied to the bas of amplifier Q3 in EVF VIC board. The amplified characte signal obtained at the collector of Q3 is supplied to characte separater Q4 which separates the AF zone signal a character signal. The character signal is then fed to amplifie Q8/Q9.

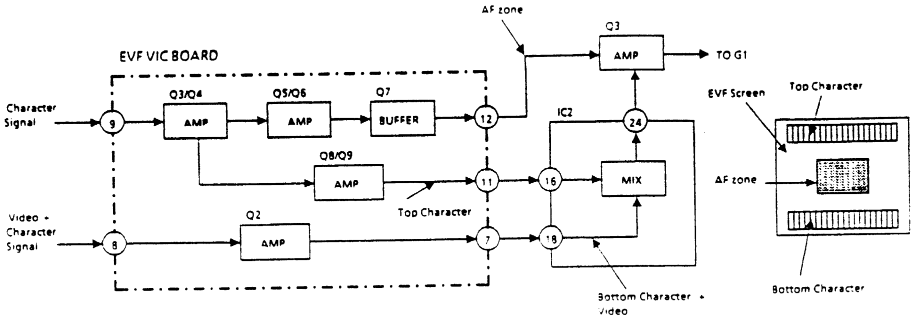


Fig. 9 Electronic Viewfinder Circuit

The amplified character signal is sent to the video mix circuit inside IC2 through pin 11 of EVF VIC board and pin 16 of IC2.

The AF zone signal is then fed to amplifier Q5/Q6. The amplified AF zone signal is fed to the emitter of Q3 through buffer Q7 and pin 12 of EVF VIC board and it is mixed with the video signal from pin 24 of IC2 through VR5.

9-2 EVF Vertical Deflection Circuit

This circuit generates vertical (V) deflection sawtooth current for V scanning of the beam inside the cathode ray tube (CRT).

The video signal from the Panel/Sync board is supplied to the sync separator circuit inside IC2 through pin 18. The V sync pulse generated in the sync separation circuit is fed to V oscillator (V. OSC) inside IC2 as a trigger pulse. The V. OSC is a free-running sawtooth generator whose frequency is approximately 50 Hz.

When the trigger pulse is supplied to the V. OSC circuit, it generates a 50 Hz sawtooth signal.

The V sawtooth signal obtained at pin 7 of IC2 is fed to an amplifier circuit inside IC2 through Pin 6 where it is amplified.

The amplified V sawtooth signal at pin 5 of IC2 is fed to the CRT deflection coil through pin 3.

VR2 (V.SIZE) is a control for vertical scanning size.

9-3 Horizontal Oscillation Circuit

The circuit controls the frequency (phase) of the horizontal sawtooth current to correspond to that of the horizontal (H) sync pulse separated from video signal. The horizontal (H) sync pulse from the sync separator is applied to the phase comparator inside IC2. The H.oscillation signal from the H. oscillator (H.OSC) circuit inside IC2 also is fed to the phase comparator and they are compared with the H.sync pulse in phase. The DC voltage corresponding to the phase difference is fed to H.OSC to control its oscillation frequency. In this way, the H.OSC is automatically controlled to match its oscillation frequency with that of the sync pulse. VR3 (AFC) is a control for setting the oscillation frequency in the steady state.

The frequency controlled H.drive (H.D) pulse obtained at pin 22 of IC2 is then fed to the Deflection circuit to generate the H.deflection sawtooth current.

9-4 Horizontal Deflection Circuit

This circuit generates the horizontal (H) defection sawtooth current for H.scanning of the beam inside the cathode ray tube (CRT).

The frequency controlled horizontal drive (H.D) pulse from the horizontal oscillation circuit is supplied to the base of switching amplifier Q2.

The horizontal (H) deflection sawtooth current obtained at the collector of Q2 is supplied to the H.deflection coil through C18, L5, L6 (h.SIZE) and pin 4 of CN2. The flyback pulse obtained at the collector of Q2 is also fed to the high voltage circuit.

9-5 High Voltage Circuit

This circuit generates high voltages for cathode ray tube (CRT) electrodes.

The flyback pulse generated in the horizontal(H) deflection circuit is supplied to the primary winding of the flyback transformer (FBT) in high voltage pack T1 to step up the flyback pulse to the necessary level. The boosted pulses obtained at the secondary winding of the transformer are rectified to generate high voltages.

+2.5KV obtained by rectifying the boosted pulse is supplied to the CRT anode.

From +270V to +430V obtained by rectifying the boosted pulse is supplied to grid-3 (G3) of the CRT through VR4 (FOCUS). The voltage of grid-2 (G2) is derived by dividing +270V to +430V by VR4, R4, R16 and R17.

The voltage of grid-1 (G1) is derived by rectifying the negative pulse from the FBT. Then the rectified −20V to −45V is supplied to G1 together with the video signal supplied from the video amplifier circuit.

The heater voltage for CRT is supplied +6V from high voltage pack T1.

9-6 +8V Regulator Circuit

The +8V DC is generated by regulating +12V supplied from the Power/Sync board. The +12V DC power from the Power/Sync board is applied to the emitter of Q1 and pin 1 of IC1 respectively.

The +5V DC is generated inside IC1 and used as a bias voltage for IC1.

Approx. 120KHz triangular signal is also generated in triangle oscillator (OSC) inside IC1 and fed to the switching amplifier inside IC1. The reference DC voltage supplied to pin 4 of IC1 whose level is set by VR1 (+8V ADJ) and +8V output DC supplied to pin 5 of IC1 are compared by the error amplifier inside IC1. The error output DC voltage corresponding to the +8V DC voltage error and triangular signal supplied from triangle OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage is obtained at pin 7 of IC1. This switching pulse is applied to the base of switching transistor Q1 switching it ON and OFF.

As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of the switching regulator circuit consisting of Q1, D1 and L2. The generated DC voltage is fed back to pin 10 of IC1 to maintain a constant output voltage.

VR1 is a control for +8V output voltage.

The regulated +8V is then supplied to other circuits as power.

9-7 +4.9V/+6.2V Regulator Circuit

The +4.9V and +6.2V DC are generated by regulating +8V generated in the +8V regulator circuit.

The +4.9V DC voltage is generated by regulating +8V DC power using IC1(a) and IC1(b)The output voltage of IC1(a) and IC(b) is applied to pin 2 of IC1(a) and pin 6 of IC(b) from a feed back loop, thus stabilizing the output voltage. The reference voltage for pin 3 of IC1(a) and pin 5 of IC1(b) is obtained by dividing the +8V using R2 and R3 and R4 and R5.

10. Gen-Lock Adaptor (WV-AD36)

10-1 Sync Separation Circuit

This circuit receives the black burst signal from the GEN-LOCK input connector of the WV-AD36 or of the remote control unit (RCU). The sync signal separated from the black burst signal in this circuit is used as a V reset pulse (field rate pulse) for the Power/Sync Sub board and internal/external switching of the gen-lock mode.

When the black burst signal is input to the GEN-LOCK connector, the black burst signal is supplied to amplifier Q1 and Q2. The amplified black burst signal is fed to sync separator Q5 and Q6 through buffer Q3 which separates the sync portion from the black burst signal. The separated sync signal is then fed to the Power/Sync board in the camera.

The amplified black burst signal is supplied to the burst gate circuit which gates the burst portion from the black burst signal.

The EXT/INT select signal from the Power/Sync board in the camera is supplied to INT/EXT controller Q19 and Q19 is turned ON. The low level is fed to the Q4 and Q4 is turned OFF. The black burst signal is sent to the sync separation circuit. The low level is also fed to the GEN-LOCK INDICATOR D2.

10-2 Burst Gate Circuit

This circuit receives the black burst signal from the sync separation circuit. The burst signal gated from the black burst signal in this circuit is used as a external subcarrier signal for the Power/Sync board and external switching of the gen-lock mode.

The black burst signal from the sync separation circuit is supplied to band pass filter CF1 to remove the low frequency component and detect the burst signal. The burst signal is then fed to amplifier Q8 and Q9 through buffer Q7.

The amplified burst signal is sent to the SC phase correction circuit Q10, Q11 and Q12 in the MAIN VIC board and controls the burst phase according to the temperature drift to meet the optimum burst phase.

The Process board in the camera has a temperature detecting thermistor which is connected between pin 24 of CN2 in the Process board and +1.8V.

When the inside temperature of the camera changes the thermistor resistance, the current is changed and it is fed to pin 4 of DC amplifier IC1 through pin 7 of VIC1.

The SC phase correction IC1 controls the burst phase of the burst signal and the burst signal is keep optimum according to temperature variations.

Service Manual

Vol. 2

Adjustment Procedures

System Camera
WVP-F10
1" Electronic Viewfinder
WV-VF01
Gen-lock Adaptor
WV-AD36

8X Auto Focus Lens
WV-LZ14/8AF
Grip Shoulder
WV-GR12
12X Power Zoom Lens
WV-LZ14/12

CONTENTS

1. TEST EQUIPMENT REQUIRED 2-1
2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT 2-2
  2-1 Camera Unit 2-2
  2-2 Auto Focus Lens Unit 2-3
  2-3 1" Viewfinder (EVF) Unit WV-VF01 2-3
3. REPLACEMENT PROCEDURE 2-4
  3-1 CCD Image Sensor Replacement 2-4
  3-2 CRT Replacement 2-6
4. DISASSEMBLY PROCEDURE 2-6
  4-1 Audio Board 2-6
  4-2 Grip/Shoulder Pad 2-7
  4-3 8X Auto Focus Zoom Lens WV-LZ14/8AF 2-8
  4-4 12X Auto Iris Zoom Lens WV-LZ14/12 2-10
  4-5 Gen-Lock Adaptor WV-AD36 2-11
5. ADJUSTMENT PROCEDURE 2-12
  5-1 Connection and Setting Up for Adjustment 2-12
  5-2 Adjustment procedure 2-14
    5-2-1 Camera Unit Adjustment 2-14
    5-2-2 Auto Tracing White-Balance (ATW) Adjustment 2-25
    5-2-3 Auto Focus Adjustment for WV-LZ14/8AF 2-26
    5-2-4 1" Viewfinder Adjustment 2-30
    5-2-5 Gen-Lock Adaptor Adjustment 2-35

6. LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

  EVF BOARD 2-31
  CCD DRIVE BOARD 2-32
  CONTROL BOARD 2-32
  PROCESS BOARD 2-33
  MICROPROCESSOR BOARD 2-33/34
  POWER/SYNC BOARD 2-34
  ATW VIC-1 BOARD 2-33
  AUDIO BOARD 2-33/34
  WV-LZ14/8AF AUTO FOCUS BOARD 2-34
  WV-AD36 GEN-LOCK ADAPTOR BOARD 2-35
7. CHIP COMPONENTS 2-36

1. TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WVP-F10 color camera.

- o Oscilloscope (dual trace, delayed, 25MHz bandwidth, with three probes)
- o Digital voltmeter (DVM)
- o Frequency counter
- o Vectorscope
- o Color video monitor
- o Tripod
- o Lighting (140 footcandles (1400 lux), 3200°K)
- o Lightmeter
- o Logarithmic gray scale chart (Part No. YWV2310RB99) (Fig. 1-1)

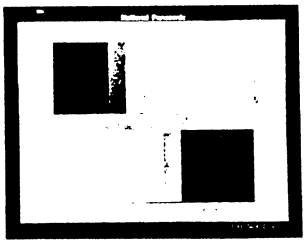


Fig. 1-1

- o Color chart (Part No. YWV2100RB98) (Fig. 1-2)

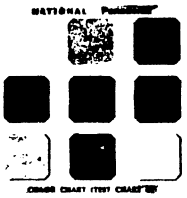
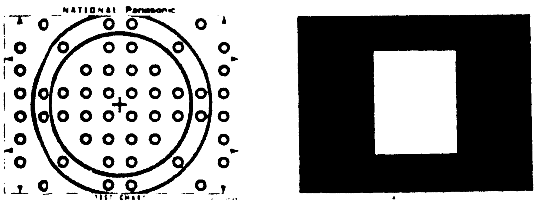


Fig. 1-2

- o Ball/White set chart (Part No. YWV2100RB03) (Fig. 1-3)

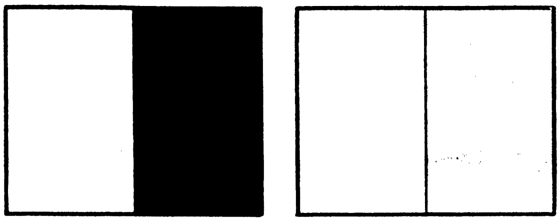


Front

Rear

Fig. 1-3

- o White/black and white/gray chart (Part No.YFWV326RB33) for Auto Focus adjustment (Fig.1-4)



Front

Rear

Fig. 1-4

- o Extension board (Fig. 1-5)
  For CCD drive board (Part No. YFVKZ326P22A)
  For other PCB board (Part No. YFVKZ326P21A)

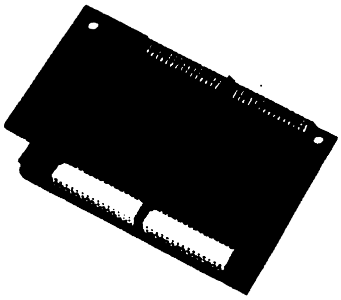


Fig. 1-5

- o ND filters for adjustments of Auto Focus and Auto Tracing White-Balance(ATW)

	1/2ND	1/4ND	1/8ND
KODAK	No.96-0.3	No.96-0.6	No.96-0.9
FUJI	ND-0.3	ND-0.6	ND-0.9
KENKO	ND-50	ND-25	ND-13
HOYA	ND-50	ND-25	ND-13
NIKON	ND2	ND4	ND8

Note : Use the filter of which diameter is more than 58 mmø for 8X Auto Focus Zoom Lens and 72 mmø for 12X Auto Iris Zoom Lens.

- o Color temperature conversion filters for adjustments of Auto Tracing White-Balance (ATW)

	Parts No	Description
KODAK	80B	More than 15X20cm (1 sheet)
FUJI	LBB-12	More than 15X20cm (1 sheet)
KENKO	LB-120	More than 72mmø (2 pcs)
HOYA	LB-120	More than 72mmø (2 pcs)
NIKON	B12	More than 72mmø (2 pcs)

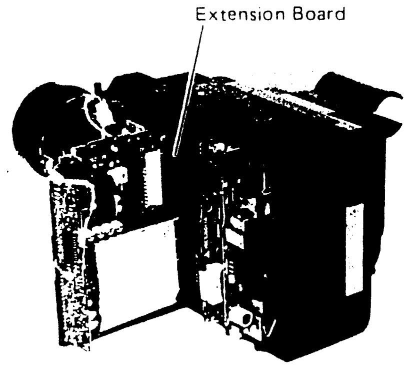

Extension Board

Fig. 2-1-7

2-2 Auto Focus Lens Unit

o Remove two screws which hold the Auto Focus Cover (A) and remove the Auto Focus Cover (A). (Fig. 2-2-1)

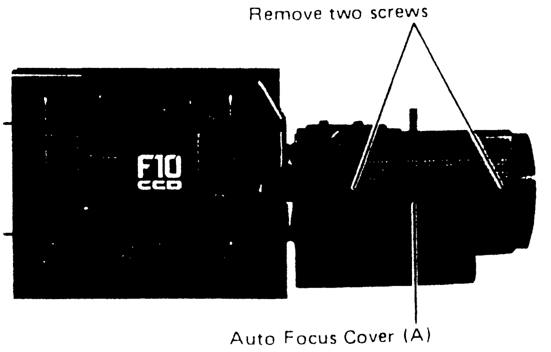

Remove two screws
F10
CCD
Auto Focus Cover (A)

Fig. 2-2-1

o Remove the Auto focus board which is held by two PCB holders. (Fig. 2-2-2)

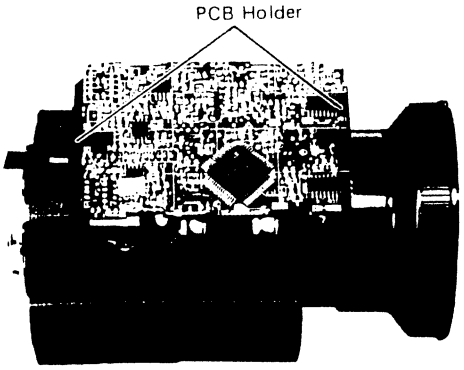


Fig. 2-2-2

2-3 1" Viewfinder (EVF) Unit WV-VF01

o Disconnect the viewfinder connector. (Fig. 2-3-1)

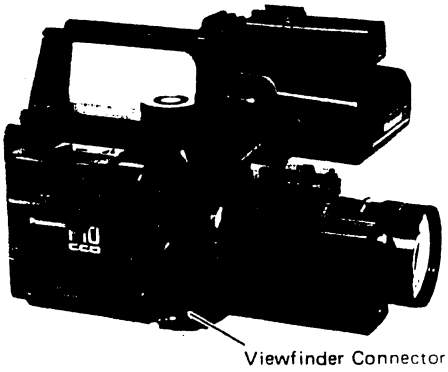

Viewfinder Connector

Fig. 2-3-1

o Remove the viewfinder by sliding it to the right (viewed from the front) while pressing the viewfinder release lever. (Fig. 2-3-2)

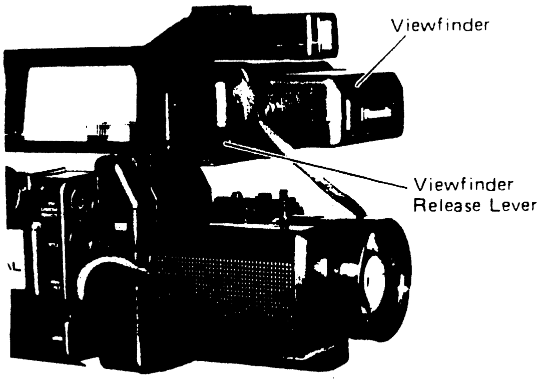

Viewfinder
Viewfinder Release Lever

Fig. 2-3-2

o Remove three screws which hold the EVF bottom cover and remove the bottom cover. (Fig. 2-3-3 and Fig. 2-3-4)

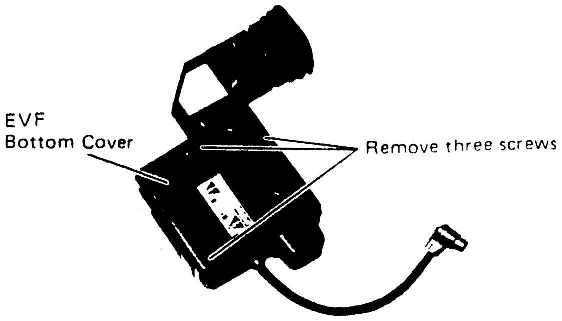

EVF Bottom Cover
Remove three screws

Fig. 2-3-3

2. DISASSEMBLY PROCEDURE FOR Adjustment

2-1 Camera Unit

- Turn OFF the power.
- Remove the grip/shoulder pad from the camera by sliding the grip/shoulder pad forward while pressing the release button. (Fig. 2-1-1)

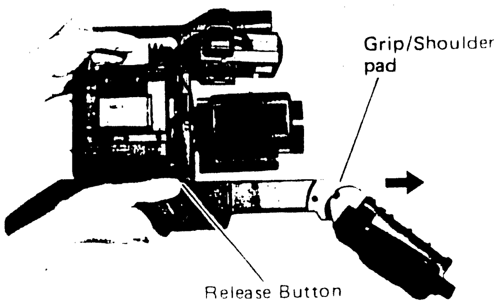

Grip/Shoulder pad
Release Button

Fig. 2-1-1

- Remove the viewfinder connector and remove the 1" viewfinder with the mounting bracket by turning the lock screw counterclockwise. (Fig. 2-1-2)

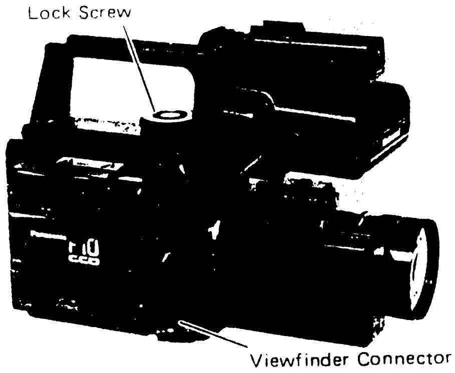

Lock Screw
Viewfinder Connector

Fig. 2-1-2

- Remove the right side cover (viewed from the front) by removing four fixing screws. (Fig. 2-1-3 to Fig. 2-1-5)

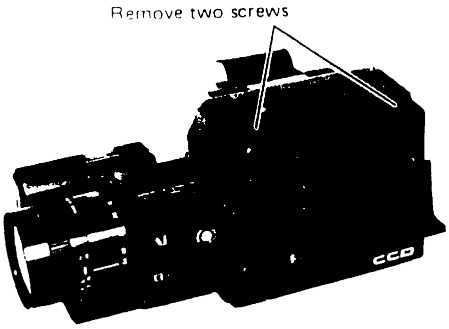

Remove two screws

Fig. 2-1-3

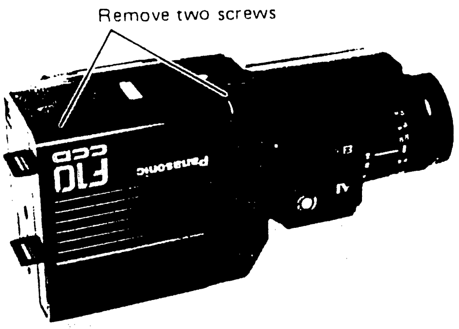

Remove two screws

Fig. 2-1-4

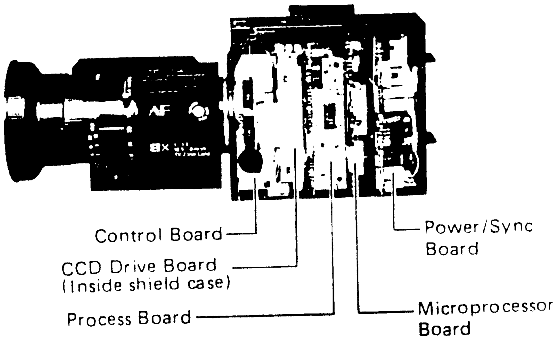

Control Board
CCD Drive Board (Inside shield case)
Process Board
Power/Sync Board
Microprocessor Board

Fig. 2-1-5

- **When adjusting the CCD drive board, remove the shield case cover by removing the screws. (Fig. 2-1-6)**

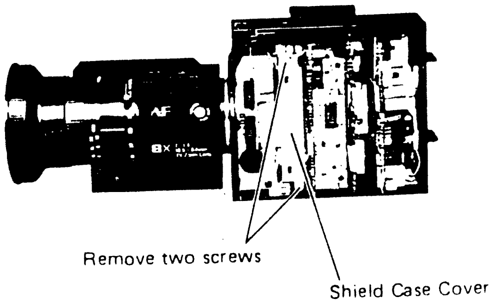

Remove two screws
Shield Case Cover

Fig. 2-1-6

- **When adjusting the controls on the Process board, use the extension board (Part No. YFVKZ326P21A). (Fig. 2-1-7) The extension board (Part No. YFVKZ326P22A) is used for the CCD drive doard. The controls on the other boards can be adjusted without the extension board.**

  Note : When inserting the PCB boards into the camera unit, insert the Microprocessor board before the Process board.

5. When inserting the PCB boards into the camera unit, insert the Microprocessor board before the Process board.

- Remove the Control board by removing two fixing screws. (Fig. 3-1-3)

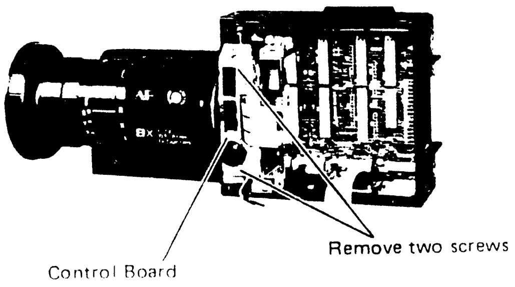

Remove two screws
Control Board

Fig. 3-1-3

- Remove two screws fixing the shield cases for the CCD drive board and CCD board. (Fig. 3-1-4)

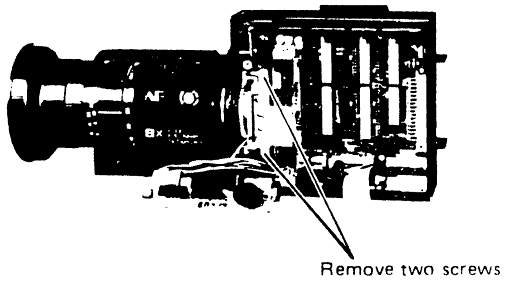

Remove two screws

Fig. 3-1-4

- Remove the lens from the camera unit by turning the lens clockwise while pressing the lens release button.
- Remove four screws fixing the left side cover (viewed from the front) and remove the cover together with the Mother board and the shield case for the CCD drive board etc. (Fig. 3-1-5 and Fig. 3-1-6)

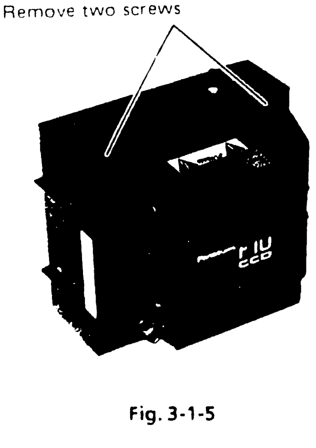

Remove two screws

Fig. 3-1-5

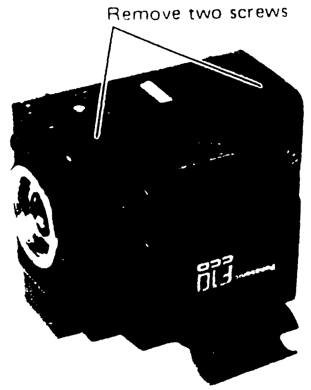

Remove two screws

Fig. 3-1-6

Note : When removing the left side cover, disconnect the flexible jumper from the connector CN1 on the ATW VIC1 board by pulling outer case of CN1. When connecting the flexible jumper, push the outer case of CN1 after inserting the jumper.

- Remove six screws which fix the rear chassis and then remove the rear chassis. (Fig. 3-1-7 and Fig. 3-1-8)

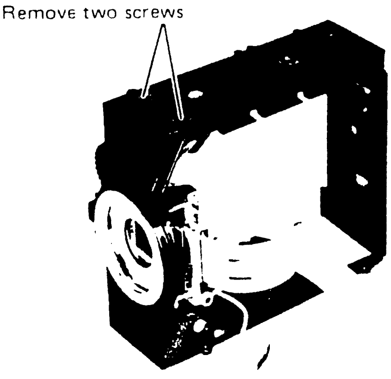

Remove two screws

Fig. 3-1-7

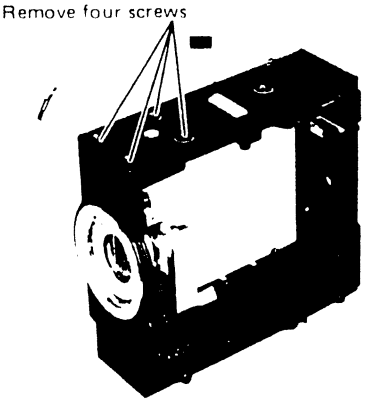

Remove four screws

Fig. 3-1-8

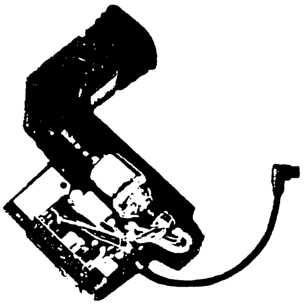


Fig. 2-3-4

3. REPLACEMENT PROCEDURE

3-1 CCD Image Sensor Replacement

- o Disassemble the camera unit as previously described in 2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.
- o Remove the shield case cover by removing two screws (Fig. 3-1-1)

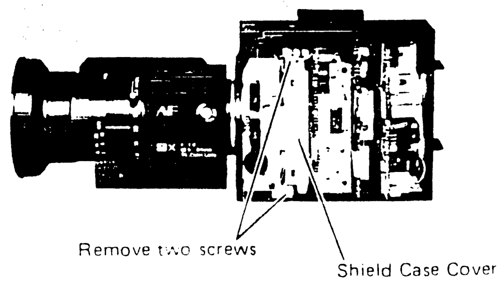

Remove two screws
Shield Case Cover

Fig. 3-1-1

- o Remove four PCB boards from the camera unit by pulling. (Fig. 3-1-2)

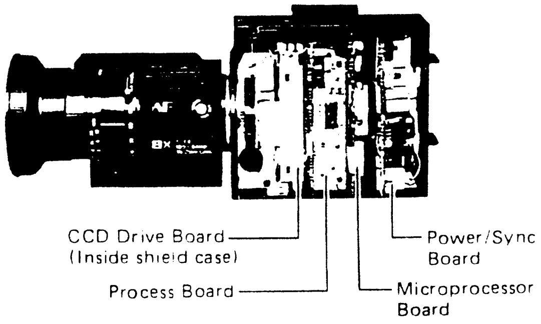

CCD Drive Board (Inside shield case)
Process Board
Power/Sync Board
Microprocessor Board

Fig. 3-1-2

Note :

1. Before pulling the Power/Sync board, remove two ground lead from the chassis.
2. Before pulling the Microprocessor board, disconnect the flexible jumper from the connector CN3 on the Microprocessor board. When disconnecting, pull the outer case of CN3 and then pull the flexible jumper. When connecting the flexible jumper, push the outer case of CN3 after inserting the flexible jumper to CN3.
3. Before pulling the CCD drive board, disconnect the flexible jumper from the connector CN2 on the CCD drive board.
4. The shield case for the CCD drive board can not be removed by pulling the case. Pull the CCD drive board inside the case.

- Remove the shield case for the CCD board by removing two screws. (Fig. 3-1-9)

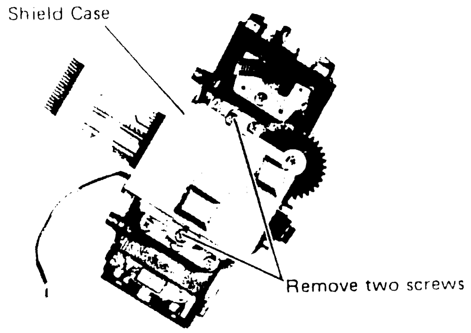

Shield Case
Remove two screws

Fig. 3-1-9

- Unsolder the CCD board from the CCD image sensor and remove the CCD assembly by removing four screws. (Fig. 3-1-10)

  Note : Ground the soldering iron when soldering or unsoldering the CCD board.

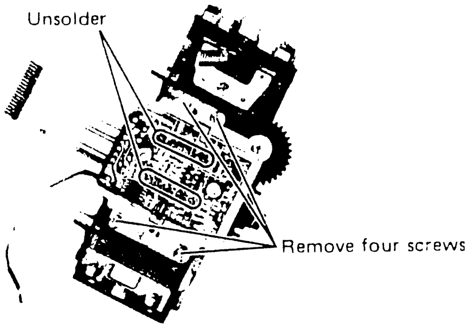

Unsolder
Remove four screws

Fig. 3-1-10

- Install the new CCD assembly on the front chassis with four screws.

  Note :
  1. The CCD assembly which consists of a CCD image sensor and a CCD holder etc. is supplied together as replacement parts.
  2. The replacement parts of CCD assembly is supplied with a spot correction ROM IC or without it. The ROM IC IC4 must be removed from the CCD drive board if the CCD assembly is supplied without the ROM IC. The ROM IC must be installed/replaced if the CCD assembly is supplied with the ROM IC.
- Solder the CCD board to the CCD image sensor and inatall the shield case. Assemble the camera unit in the reverse order of disassembling.

3-2 CRT Replacement

- Disassemble the 1" viewfinder unit as previously described in 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.
- Remove one screw on the CRT bottom cover and remove the bottom cover. (Fig. 3-2-1)

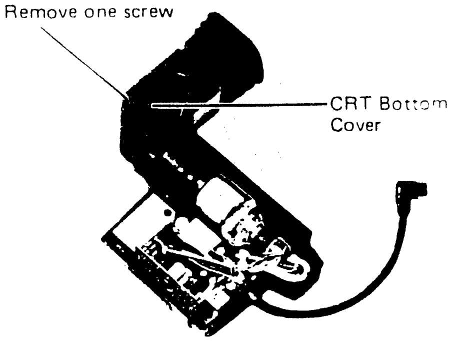

Remove one screw
CRT Bottom Cover

Fig. 3-2-1

- Disconnect the CRT socket, loosen the deflection yoke holding screw and then replace the CRT. (Fig. 3-2-2)

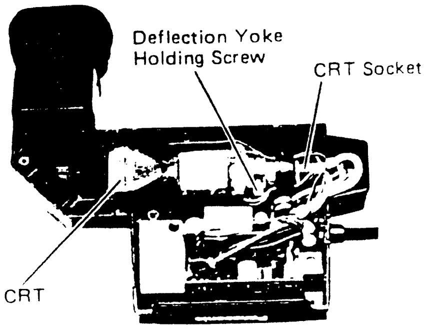

Deflection Yoke Holding Screw
CRT Socket
CRT

Fig. 3-2-2

- After replacing the parts, reinstall the viewfinder in the reverse order of disassembly.

4. DISASSEMBLY PROCEDURE

4-1 Audio Board

- Remove the microphone.
- Remove four screws fixing the connector cover (B) and remove the connector cover (B). (Fig. 4-1-1)

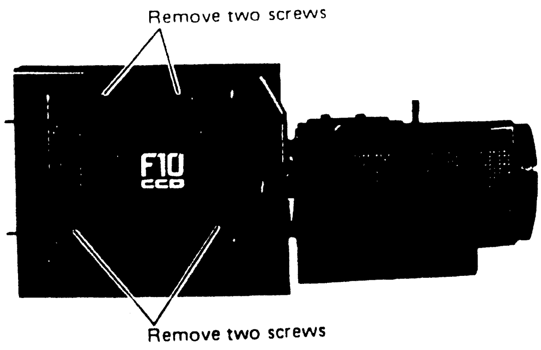

Remove two screws
F10
CCD
Remove two screws

Fig. 4-1-1

- Remove one screw fixing the Audio board and remove the Audio board. (Fig. 4-1-2 and Fig. 4-1-3)

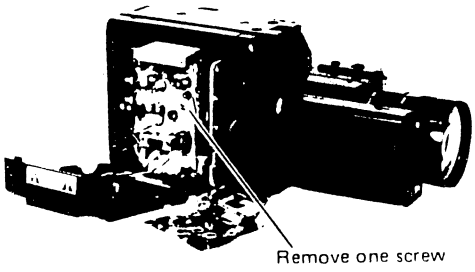

Remove one screw

Fig. 4-1-2

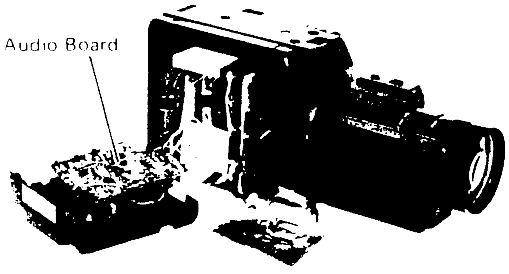

Audio Board

Fig. 4-1-3

4-2 Grip/Shoulder Pad

- Remove the grip/shoulder pad from the camera by sliding the grip/shoulder pad forward while pressing the release button. (Fig. 4-2-1)

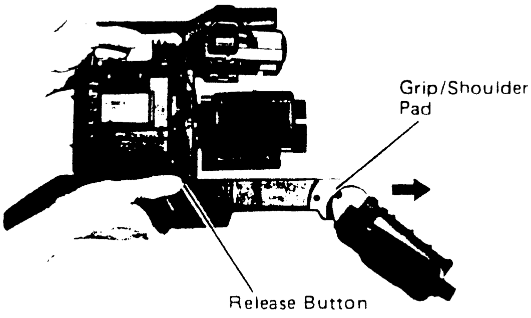

Grip/Shoulder Pad
Release Button

Fig. 4-2-1

- While lifting up the plate spring in the shoulder pad, slide the shoulder pad backward to remove it. (Fig. 4-2-2)

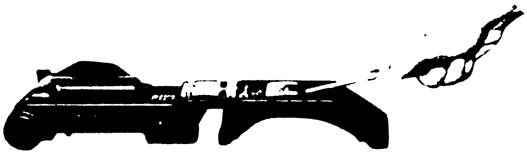


Fig. 4-2-2

- Remove seven screws on the grip arm cover and remove the right side arm cover. (Fig. 4-2-3 to Fig. 4-2-6)

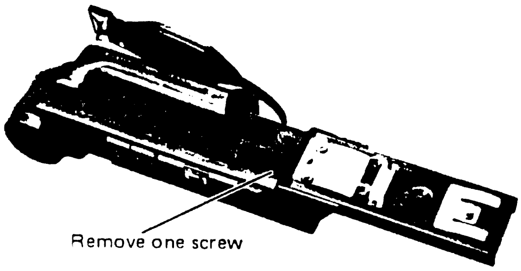

Remove one screw

Fig. 4-2-3

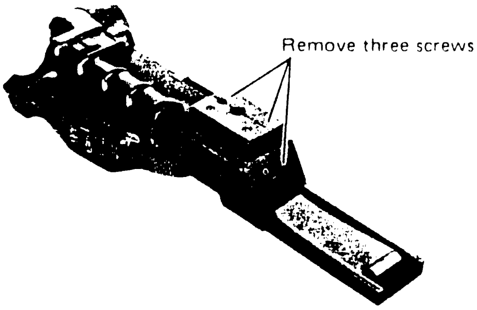

Remove three screws

Fig. 4-2-4

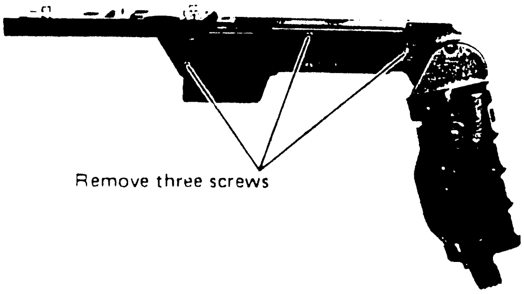

Remove three screws

Fig. 4-2-5

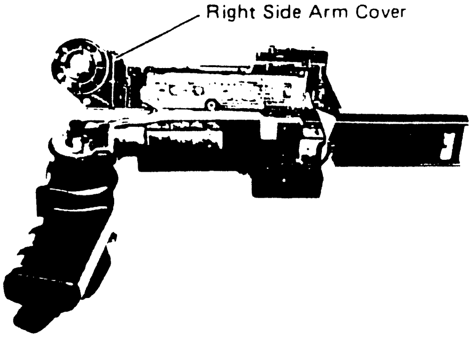

Right Side Arm Cover

Fig. 4-2-6

4-3 8X Auto Focus Zoom Lens WV-LZ14/8AF

- o Disconnect the lens connector from the camera.
- o Remove the lens hood by turning it counterclockwise.
- o While depressing the lens release button on the camera backward, remove the lens by turning it clockwise (approximately 60°). (Fig. 4-3-1)

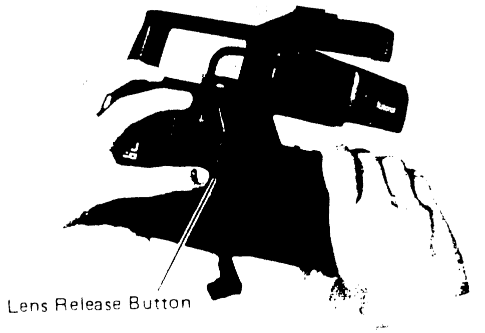

Lens Release Button

Fig. 4-3-1

- o Remove four screws which hold the Auto Focus Cover (A) and (B) and remove the Auto Focus Cover (A). (Fig. 4-3-2)

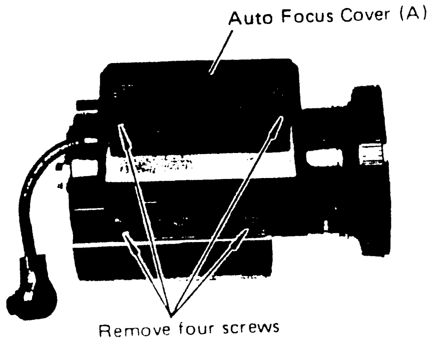

Auto Focus Cover (A)
Remove four screws

Fig. 4-3-2

- o Remove the Auto focus board held by the PCB holders. (Fig 4-3-3)

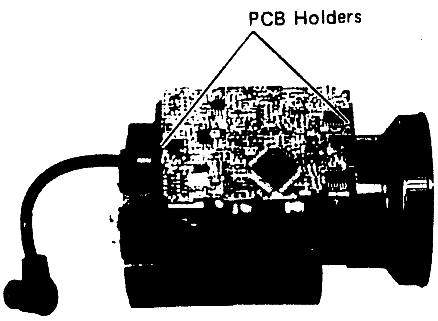

PCB Holders

Fig. 4-3-3

- o Disconnect four connectors CN4, CN5, CN6 and CN7 and remove the Auto focus board. (Fig. 4-3-4)
- o Remove two screws which hold the Auto Focus Cover (B) and remove the Auto Focus Cover (B). (Fig. 4-3-4)

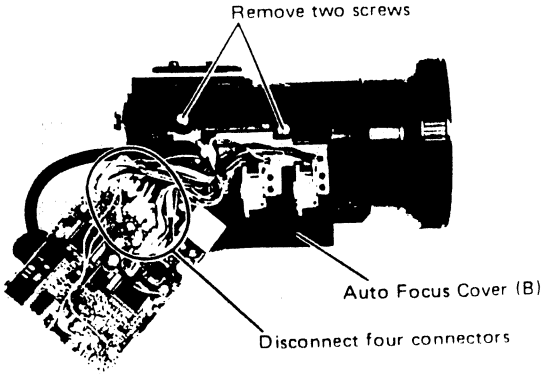

Remove two screws
Auto Focus Cover (B)
Disconnect four connectors

Fig. 4-3-4

- o Remove eight screws which hold the Lens Cover (A) and(B) and remove the Lens Cover (A) and (B). (Fig. 4-3-5 and Fig. 4-3-6)

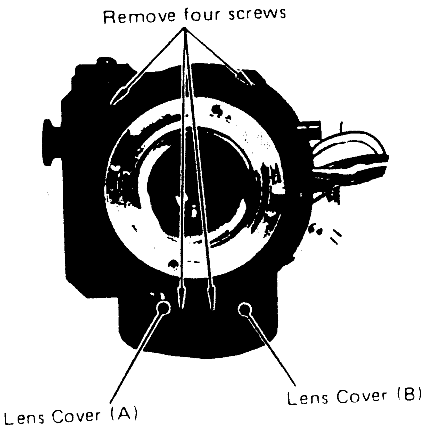

Remove four screws
Lens Cover (A)
Lens Cover (B)

Fig. 4-3-5

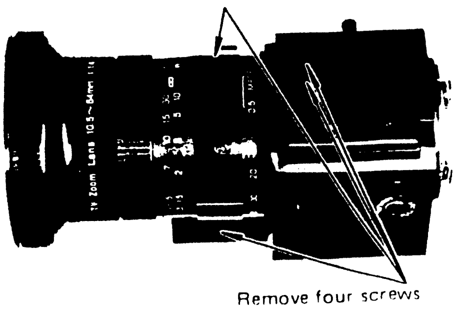

Remove four screws

Fig. 4-3-6

- o Remove four screws which hold the zoom sensor and focus sensor and remove the zoom sensor and focus sensor. (Fig. 4-3-7)
- o Remove two screws which hold the mount plate and remove mount. (Fig. 4-3-7)

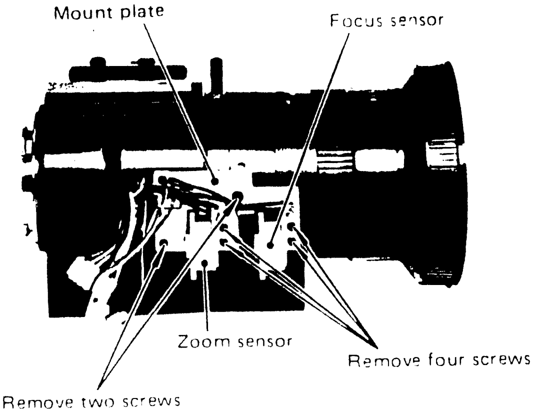

Mount plate
Focus sensor
Zoom sensor
Remove four screws
Remove two screws

Fig. 4-3-7

- o Remove two screws which hold the zoom focus motor assembly and remove the zoom focus motor assembly. (Fig. 4-3-8)

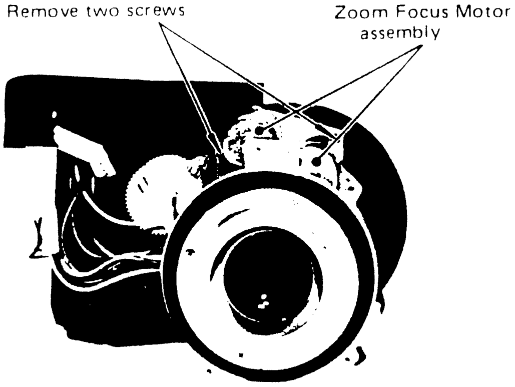

Remove two screws
Zoom Focus Motor assembly

Fig. 4-3-8

- o Remove three screws which hold the Flange assembly and remove the Flange assembly. (Fig. 4-3-9)

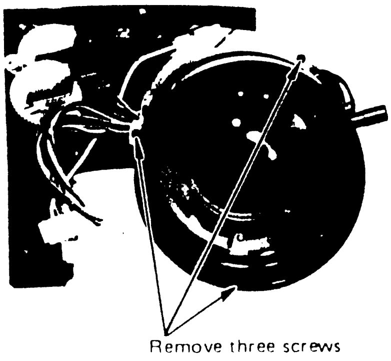

Remove three screws

Fig. 4-3-9

- o Remove three screws which hold the AIC assembly and remove the AIC assembly. (Fig. 4-3-10)

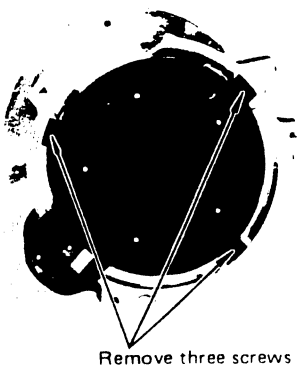

Remove three screws

Fig. 4-3-10

- o Remove four screws which hold the supporter of iris cover and remove the supporter of iris cover. (Fig. 4-3-11)

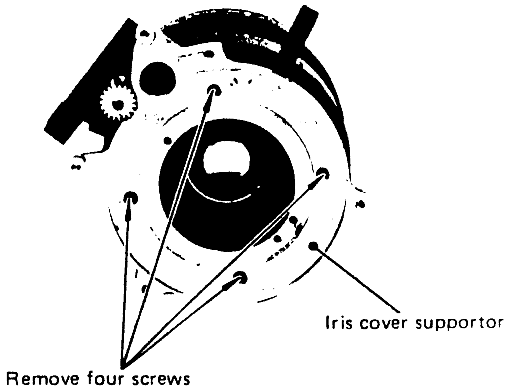

Iris cover supportor
Remove four screws

Fig. 4-3-11

- o Remove two screws which hold the holder assembly of focus gear and remove the holder assembly and the focus gear assembly. (Fig. 4-3-12)

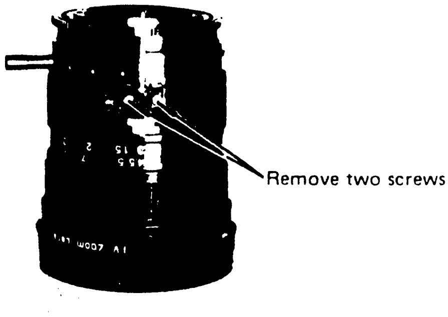

Remove two screws

Fig. 4-3-12

- o After replacing the parts, reinstall the lens in reverse order of disassembly procedure.

  Note : When replacing the lens mounting assembly, clean the lens with lens cleaning tissue.

4-4 12X Auto Iris Zoom Lens WV-LZ14/12

- o Disconnect the lens connector from the camera.
- o Remove the lens hood by turning it counterclockwise.
- o While depressing the lens release button on the camera backward, remove the lens by turning clockwise (approximately 60°).
- o Remove six screws which hold the Lens Cover (A) and (B) and remove the covers. (Fig. 4-4-1 and Fig. 4-4-2)

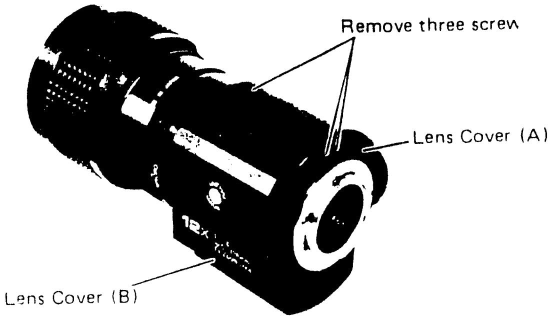

Remove three screw
Lens Cover (A)
Lens Cover (B)

Fig. 4-4-1

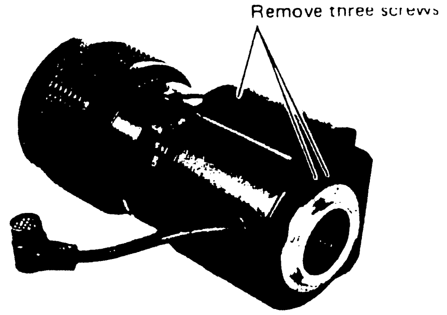

Remove three screws

Fig. 4-4-2

Note : Assemble the Lens Cover (B) while pushing the zoom gear forward. (Fig. 4-4-3)

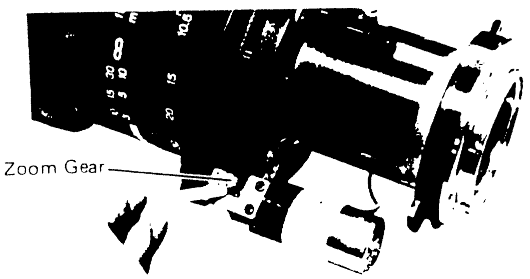


Fig. 4-4-3

- o For removing the zoom motor :
  Remove two screws fixing the zoom gear assembly (Fig 4-4-4) and remove the zoom motor by removing two fixing screws. (Fig. 4-4-5)

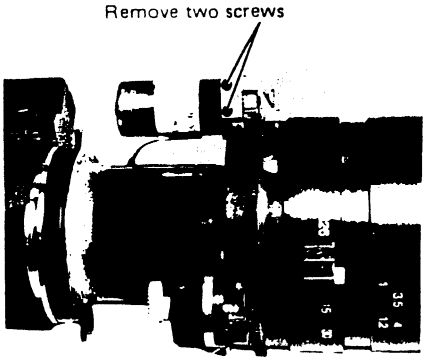

Remove two screws

Fig. 4-4-4

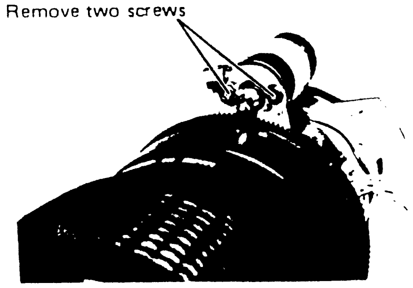

Remove two screws

Fig. 4-4-5

- o For removing the AIC (auto iris control) assembly :
  Remove four screws which fix the master lens assembly and remove the master lens assembly. (Fig. 4-4-6 and Fig 4-4-7)

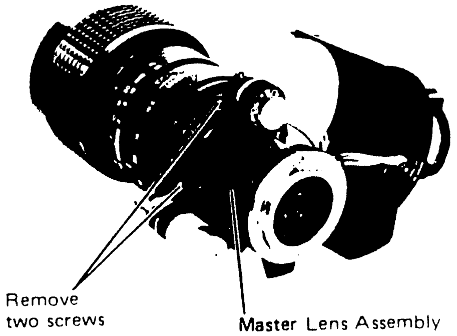

Remove
two screws
Master Lens Assembly

Fig. 4-4-6

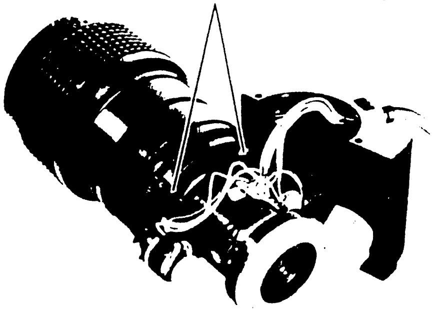

Remove two screws

Fig. 4-4-7

Note : When assembling the master lens assembly, line up the red indicator on the lens mount and focal assembly.

Remove the AIC assembly by removing three fixing screws on the master lens assembly. (Fig. 4-4-8)

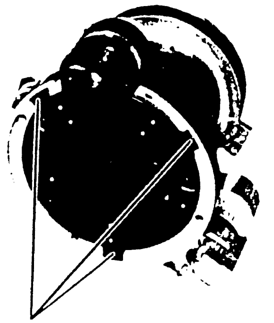

Remove three screws

Fig. 4-4-8

4-5 Gen-Lock Adaptor WV-AD36

o Remove four screws on the cover and remove the mounting base from the unit. (Fig. 4-5-1)

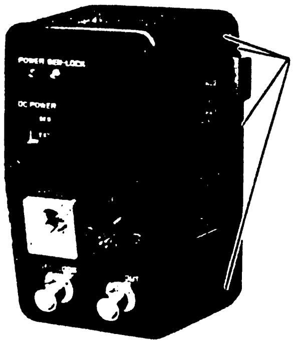

POWER GEN-LOCK
DC POWER
Remove four screws

Fig. 4-5-1

o Remove the Main board by removing three fixing screws. (Fig. 4-5-2 and Fig. 4-5-3)

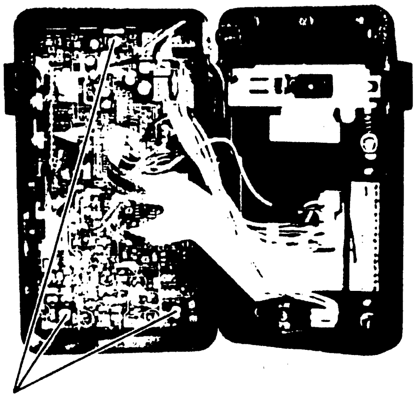

Remove three screws

Fig. 4-5-2

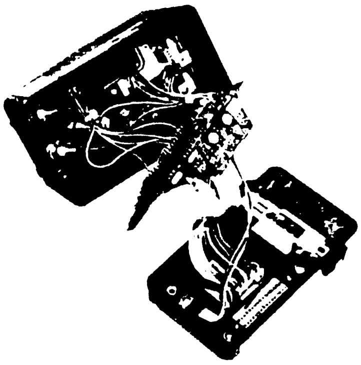


Fig. 4-5-3

5. ADJUSTMENT PROCEDURE

5-1 Connection and Setting Up for Adjustment

Connection

- o Connect the camera cable between the camera and the power supply WV-PS01 or mount the AC adaptor WV-PS03 on the camera unit.
- o Connect the video cable from the power supply WV-PS01 to the color video monitor through the vectorscope, or connect coaxial cable between the AC adaptor WV-PS03 and the color video monitor through the vectorscope.
- o Terminate the video input of the color video monitor with 75 ohm. (Fig. 5-1 and Fig.5-2)

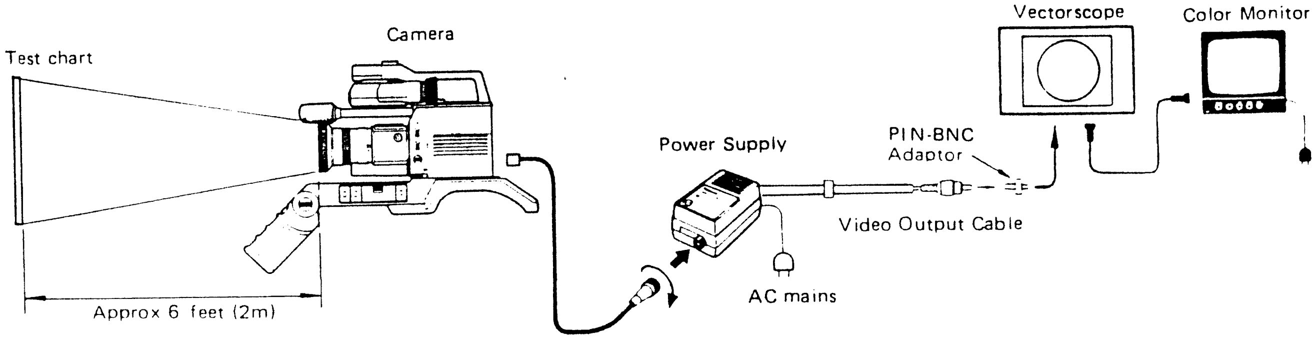

Test chart
Camera
Power Supply
PIN-BNC Adaptor
Vectorscope
Color Monitor
Video Output Cable
AC mains
Approx 6 feet (2m)

Fig. 5-1

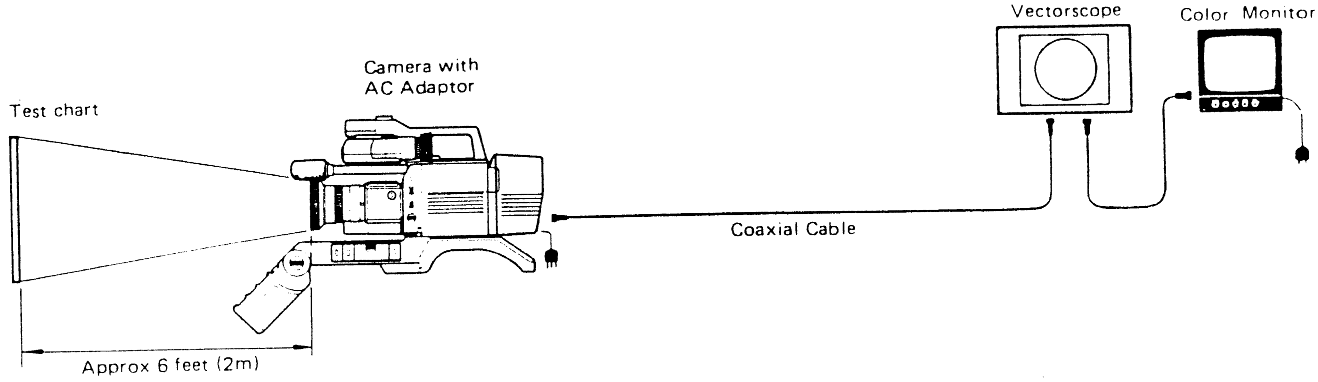

Test chart
Camera with AC Adaptor
Vectorscope
Color Monitor
Coaxial Cable
Approx 6 feet (2m)

Fig. 5-2

Disassembling

- Disassemble the camera according to Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.

Setting up

- Light : Incident light intensity on chart : 140 footcandles (1400 lux)
  Color temperature : 3200°K
- Test Charts : Logarithmic gray scale chart (YWV2310RB99)
  Color chart (YWV2100RB98)
  Flat white chart/paper
  White/black and white/gray chart (YFWV326RB33)
  Ball/White set chart (YWV2100RB03)

Position of controls and switches on the camera

- Set the controls and switches on the camera as follows;

- Right Side -
[Control Board]
Standby switch (SW1) : Right (ON) position
AGC selection switch (SW2) : Center (LOW) position
White balance selection switch (SW3) : Upper (AWC) position
Auto iris control (VR2) : Center (detent) position

[Microprocessor Board]
SES (Strobe effect shutter)/normal selection switch(SW1) : Lower (NORMAL) position

[Power/Sync Board]
Level indicator switch (SW3) : Upper (ON) position

- Left Side -
[Audio Board]
Red gain control (VR1) : Mechanical center position
Blue gain control (VR2) : Mechanical center position
Audio level selection switch (SW1) : Left (-20dB) position
DC power selection switch (SW2) :
For WV-PS01 : Right (VTR) position
For WV-PS03 : Left (EXT) position

-Rear Side-
[Mother Board]
VTR compatibility switch (VR1) : Upper (⊕) position

-Grip Arm-
Record/playback selection switch : Lower (REC) position

5-2 Adjustment Procedure

Refer to page 2-32 to 34 for the test points and adjusting controls.

Caution :

1. Do not set the white balance (AWC) during the adjustment. (The blinking WHITE warning indicator should be seen in the viewfinder during adjustment. Install the backup battery for observing the blinking WHITE indicator.) If the automatic white balance is set accidentally, set the White Balance Selection Switch (AWC/ATW) to the AWC position and turn OFF the power switch once to reset the white balance previously set.
2. Aim the camera at the logarithmic gray scale chart or color chart during the adjustment so that chart fully occupies the raster of the monitor. (Fig. 5-2-1)

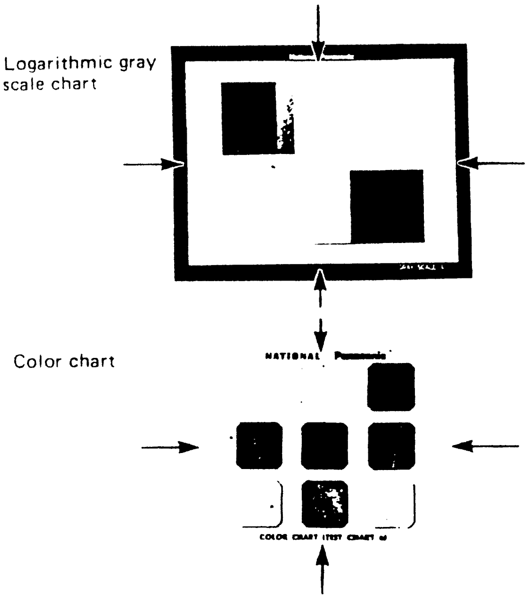


Fig. 5-2-1

5-2-1 Camera Unit Adjustment

(1) +4.9V Adjustment

Test point:	TP3 (+4.9V)	Power/sync board
Adjust:	VR3 (+4.9V ADJ)	Power/sync board

- o Connect the digital voltmeter (DVM) to TP3 (+4.9V).
- o Adjust VR3 (+4.9V ADJ) for 4.9V ±0.05V.

(2) Subcarrier adjustment

Test point:	Pin 9 of CN1 (SC 2 OUT)	Power/sync board
Adjust:	VR1 (SC ADJ)	Power/sync board

- o Connect the frequency counter to pin 9 of multi-connector CN1 (SC2 OUT).
- o Adjust VR1 (SC ADJ) for 4.433616MHz ± 50Hz.

(3) Internal and gen-lock VCO adjustment

Test point:	TP1 (INT SYNC VCO)	VIC3/Power/sync board
	TP1 (GEN-LOCK VCO)	VIC1/Power/sync board
Adjust:	L3 (INT SYNC VCO)	VIC3/Power/sync board
	L3 (GEN-LOCK VCO)	VIC1/Power/sync board

- o Connect the digital voltmeter (DVM) to TP1 (INT SYNC VCO) on the VIC3 of the Power/sync board.
- o Adjust L3 (INT SYNC VCO) on the VIC3 of the Power/sync board for 3.5V ± 0.5V.
- o Mount the gen-lock adaptor WV-AD36 on the camera.
- o Supply the color bar or black burst signal from the signal generator to the Gen-lock input connector on the gen-lock adaptor.
- o Connect the digital voltmeter (DVM) to TP1 (GEN-LOCK VCO) on the VIC1 of the Power/sync board.
- o Adjust L3 (GEN-LOCK VCO) on the VIC1 of the Power/sync board for 4V ± 0.2V.

(4) V transfer pulse adjustment

Test point:	TP3 (øV)	CCD drive board
Adjust:	VR4 (øV_H ADJ)	CCD drive board
	VR5 (øV_M ADJ)	CCD drive board

- o Cap on the lens.
- o Set the AGC Selection Switch SW2 on the Control board on the side of camera to the HIGH position.
- o Connect the oscilloscope to TP3 (øV) and set the oscilloscope to V. rate.
- o Set the input of the oscilloscope to the DC-coupled.
- o Adjust VR4 (øV_H ADJ) so that the high level of the V.

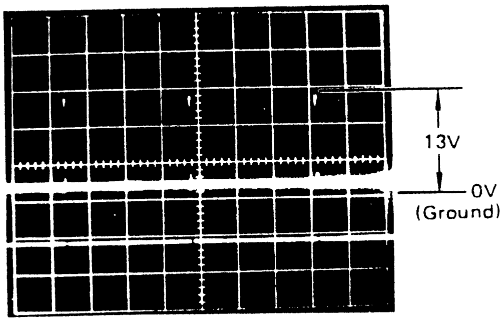


Fig. 5-2-2

- o Confirm that the black horizontal lines are not observed in the Zone I on the color video monitor. (Fig. 5-2-3 and Fig. 5-2-4)

Note : Adjust the contrast brightness of the color video monitor for better viewing.

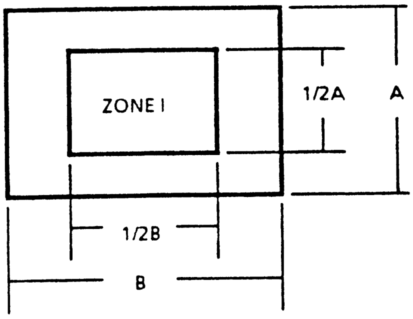


Fig. 5-2-3

NO GOOD GOOD

Fig. 5-2-4

- o If the black horizontal lines are observed in the Zone I, readjust VR4 (øV_H ADJ) so that the black horizontal lines disappear from the Zone I. After adjustment, confirm that the high level of the V. transfer pulse is 13V ~ 15V. (Fig. 5-2-5)

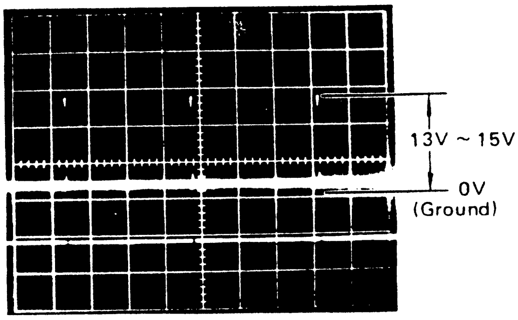


Fig. 5-2-5

- o Set the oscilloscope to H. rate.
- o Adjust VR5 (øV_M ADJ) so that the middle level of the V. transfer pulse at TP3 is 3 ± 0.1V. (Fig. 5-2-6)

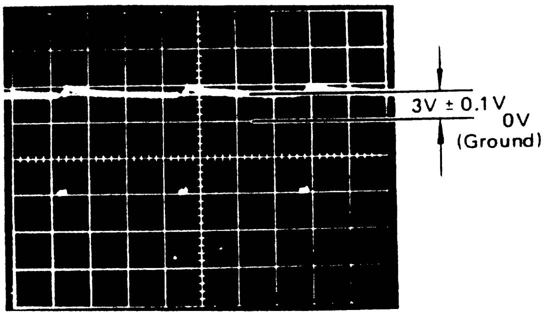


Fig. 5-2-6

- o Reset the AGC Selection Switch to the LOW position.

(5) f_H PLL adjustment

Test point:	TP1 (f_H VCO)	CCD drive board
Adjust:	L7 (f_H VCO)	CCD drive board

- o The extension board YFVKZ326P22A is required for this adjustment.
- o Connect the digital voltmeter (DVM) to TP1.
- o Adjust L7 (fH VCO) for 3 ± 0.2V.

6 CCD bias coarse adjustment

Adjust:	VR1 (CCD BIAS)	CCD drive board
Observe:	Color video monitor	

- o Aim the camera at a 40-watt lamp placed in front of the dark background (Fig 5-2-7)

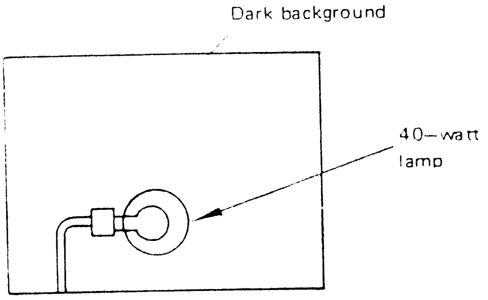


Fig. 5-2-7

- o Turn the Auto Iris Control VR2 on the Control board on the side of camera fully clockwise to the OPEN position
- o While observing the picture on the color video monitor, turn VR1 (CCD BIAS) clockwise or counterclockwise and stop it at a point where the blooming and the noise are minimized. (Fig. 5-2-8)

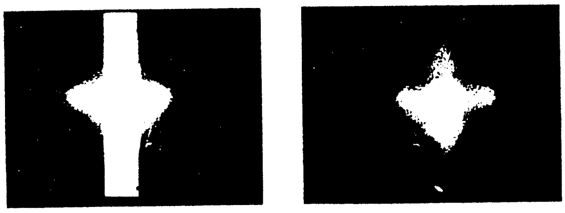

NO GOOD GOOD

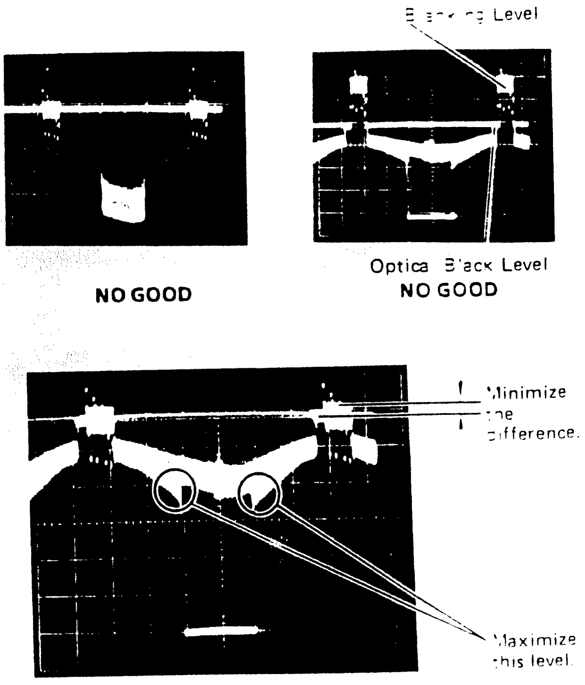
Fig. 5-2-8

- o Set the Auto Iris Control VR2 to the center detent position.

7. Output gate adjustment

Test point:	TP1 (PREVIDEO-1)	Process board
	TP2 (PREVIDEO-2)	Process board
Adjust:	VR2 (OUTPUT GATE)	CCD drive board
Observe:	Color video monitor	

- o Aim the camera at the white set/window chart so that the chart fully occupies the color video monitor.
- o Turn the Auto Iris Control VR2 on the Control board on the side of camera fully clockwise to the OPEN position.
- o Connect the oscilloscope to TP1 on the Process board and set the oscilloscope to H rate.
- o Adjust VR2 (OUTPUT GATE) so that the black level following to the white level at TP1 is maximum and the difference between the blanking level and the optical black level is minimum. (Fig. 5-2-9)



NO GOOD NO GOOD

GOOD

Fig. 5-2-9

- o Set the Auto Iris Control VR2 to the center detent position.
- o Cap on the lens and the SES/Normal Selection Switch SW1 on the Microprocessor board to the upper (SES) position.
- o Confirm that there is no white-shadow at the higher portion of picture. If it is observed, carefully readjust VR2 (OUTPUT GATE) so that the shadow just disappears from the screen. (Fig. 5-2-10-1)

  Note : Adjust the contrast and brightness of the color video monitor for better viewing

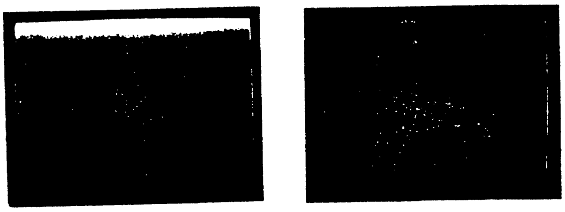
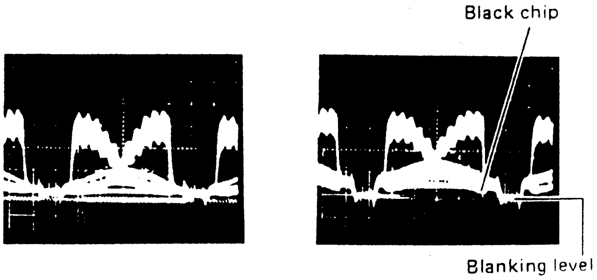

NO GOOD GOOD

Fig. 5-2-10-1

- o Remove the lens cap.
- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to TP2 (PREVIDEO-2) on the Process board and set the oscilloscope to H rate.

- Confirm that the lowest step (black chip) of gray scale is higher than blanking level of waveform. If not, readjust VR2 so that the lowest step of gray scale is higher than blanking level. (Fig. 5-2-10-2)



NO GOOD GOOD

Fig. 5-2-10-2

- Repeat above steps until the white shadow disappears and the lowest step of gray scale is higher than blanking level.

(8) Flangeback adjustment

Adjust:	Flangeback adjusting gear
Observe:	Color video monitor

- Remove the flangeback adjusting gear cover from the camera by sliding. (Fig. 5-2-11)

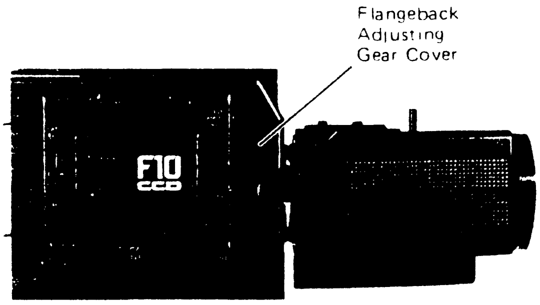


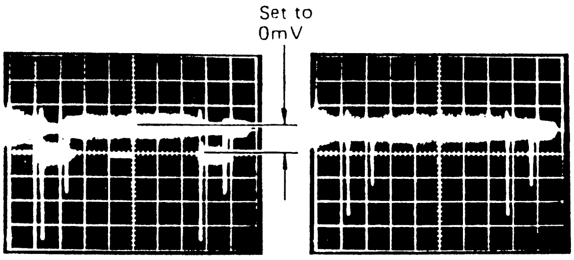
Fig. 5-2-11

- Aim the camera at the dark object further than 6 feet (2m) from the camera.
- Turn the Auto Iris Control VR2 on the Control board to the OPEN position.
- Zoom in (close up/telephoto) and adjust the focus by turning the lens focus.
- Zoom out (wide angle) and adjust the focus by turning the flangeback adjusting gear.
- Zoom in again and adjust the focus by turning the lens focus.
- Zoom out again and adjust the focus by turning the flangeback adjusting gear.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Reset the Auto Iris Control VR2 to the center detent position.

(9) Pedestal adjustment

Test point:	TP3 (Y OUT)	Process board
Adjust:	VR2 (PEDESTAL)	Process board

- Cap on the lens.
- Connect the oscilloscope to TP3 (Y OUT).
- Set the oscilloscope to H. rate.
- Adjust VR2 (PEDESTAL) so that the pedestal level at TP3 (Y OUT) becomes 0mV ± 5mV. (Fig. 5-2-12)



NO GOOD GOOD

Fig. 5-2-12

(10) AIC level adjustment

Test point:	TP2 (PREVIDEO-2)	Process board
Adjust:	VR2 (AIC LEVEL)	Microprocessor board

- Aim the camera at the logarithmic gray scale chart so that the chart fully occupies the raster of the color video monitor.
- Connect the oscilloscope to TP2 (PREVIDEO-2).
- Set the oscilloscope to H. rate.
- Adjust VR2 (AIC LEVEL) so that the waveform is 0.5V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-13)

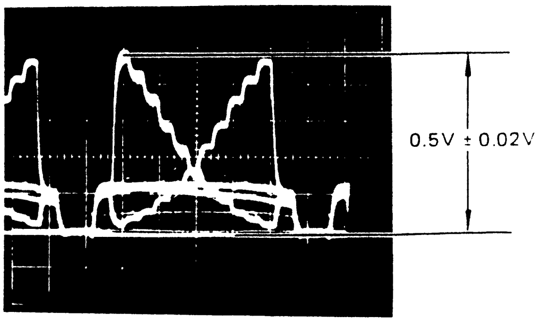


Fig. 5-2-13

(11) AGC adjustment

Test point:	TP3 (Y OUT)	Process board
Adjust:	VR1 (AGC GAIN)	Process board
	VR1 (GAIN SET)	Control board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP3 (Y OUT).
- Set the oscilloscope to H. rate.
- Set the AGC Selection Switch SW2 on the Control board on the side of the camera to the lower (OFF) position.
- Adjust VR1 (GAIN SET) on the Control board for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-14)

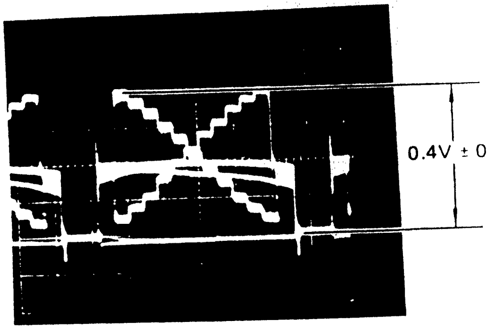


Fig. 5-2-14

- Set the AGC Selection Switch SW2 to the center (LOW) position.
- Adjust VR1 (AGC GAIN) on the Process board for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-14)

(12) YH 1H delay adjustment

Test point:	TP1 (YH (1H) BIAS)	VIC3(a)/Process board
	TP5 (YH (1H) OUT)	Process board
Adjust:	VR1 (1H DELAY BIAS)	VIC3(a)/Process board
	VR2 (YH (1H) GAIN)	VIC3(a)/Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP1 on the VIC3(a) of the Process board.
- Set the oscilloscope to H. rate.
- Set the input of the oscilloscope to the DC- coupled.
- Turn VR1 (1H DELAY BIAS) on the VIC3(a) of the Process board fully counterclockwise to minimize the DC level.
- Adjust the vertical position control of the oscilloscope so that the DC waveform coincides with the voltage scale of the oscilloscope. (Fig. 5-2-15)

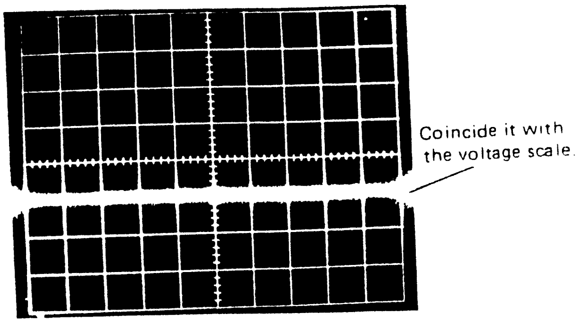


Fig. 5-2-15

- Adjust VR1 (1H DELAY BIAS) so that the blanking level increases 700mV ± 20mV. (Fig. 5-2-16)

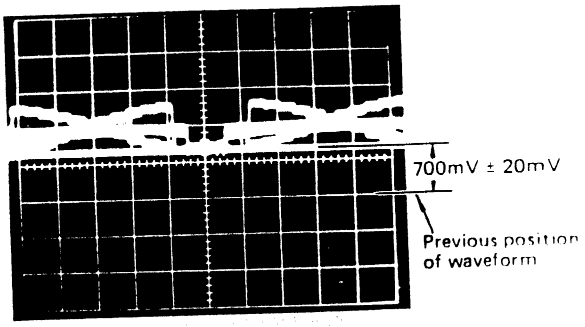


Fig. 5-2-16

- Change the probe of the oscilloscope from TP1 on the VIC3(a)/Process board to TP5 on the Process board.
- Set the input of the oscilloscope to the AC- coupled.
- Adjust VR2 (YH (1H) GAIN) on the VIC3(a)/Process board for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-17)

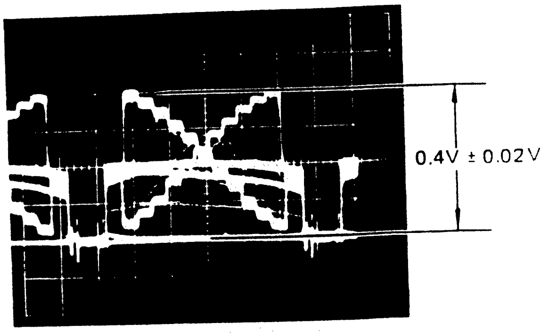


Fig. 5-2-17

(13) YH 2H delay adjustment

Test point:	TP1 (YH (2H) BIAS)	VIC3(b)/Process board
	TP6 (YH (2H) OUT)	Process board
Adjust:	VR1 (2H DELAY BIAS)	VIC3(b)/Process board
	VR2 (YH (2H) GAIN)	VIC3(b)/Process board

- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to TP1 on the VIC3(b) of the Process board.
- o Set the oscilloscope to H. rate.
- o Set the input of the oscilloscope to the DC- coupled.
- o Turn VR1 (2H DELAY BIAS) on the VIC3(b) of the Process board fully counterclockwise to minimize the DC level.
- o Adjust the vertical position control of the oscilloscope so that the DC waveform coincides with the voltage scale of the oscilloscope. (Fig. 5-2-18)

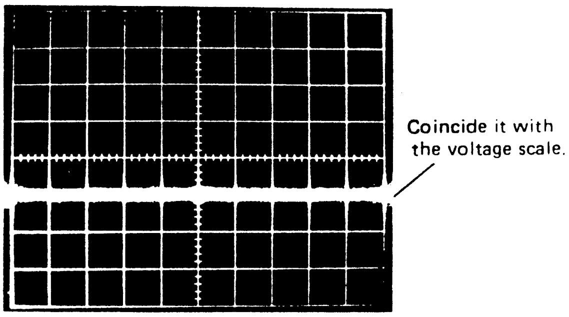


Fig. 5-2-18

- o Adjust VR1 (2H DELAY BIAS) so that the blanking level increases 700mV ± 20mV. (Fig. 5-2-19)

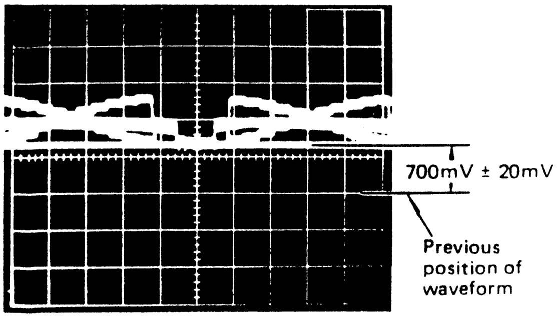


Fig. 5-2-19

- o Change the probe of the oscilloscope from TP1 on the VIC3(b)/Process board to TP6 on the Process board.
- o Set the input of the oscilloscope to the AC- coupled.
- o Adjust VR2 (YH (2H) GAIN) on the VIC3(b)/Process board for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-20)

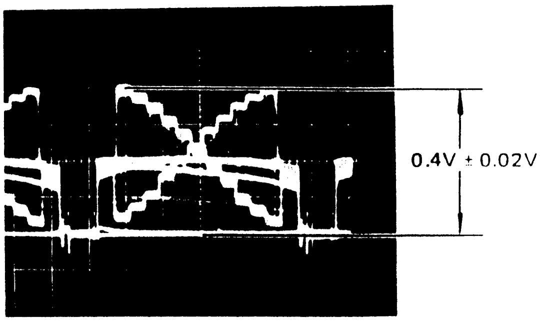
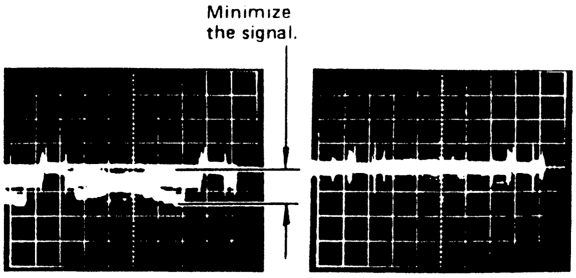


Fig. 5-2-20

(14) Vertical edge balance adjustment

Test point:	TP1 (V.EDGE)	VIC4/Process board
Adjust:	VR1 (V.EDGE BALANCE)	VIC4/Process board

- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to TP1 (V.EDGE) on the VIC4 of the Process board.
- o Set the oscilloscope to H. rate.
- o Adjust VR1 (V.EDGE BALANCE) so that the gray scale waveform becomes minimum. (Fig. 5-2-21)



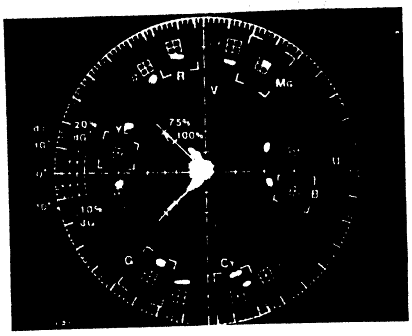
NO GOOD **GOOD**

Fig. 5-2-21

(15) Chroma phase detection and gain adjustment

Test point:	Video output connector	
	TP4 (R/B OUT)	Process board
Adjust:	VR3 (R/B GAIN)	Process board
	VR4 (PHASE DETECT)	Process board

- o Connect the Video Output Connector to the vectorscope.
- o Aim the camera at the color chart so that the chart fully occupies the raster of the color video monitor.
- o Adjust VR4 (PHASE DETECT) so that the color vector is maximum on the vectorscope. (Fig. 5-2-22)



Maximize the vectors.

Fig. 5-2-22

- o Connect the oscilloscope to TP4 (R/B OUT) and set the oscilloscope to H. rate.
- o Adjust VR3 (R/B GAIN) so that the signal level at TP4 is 0.6 ± 0.01Vp-p. (Fig. 5-2-23)

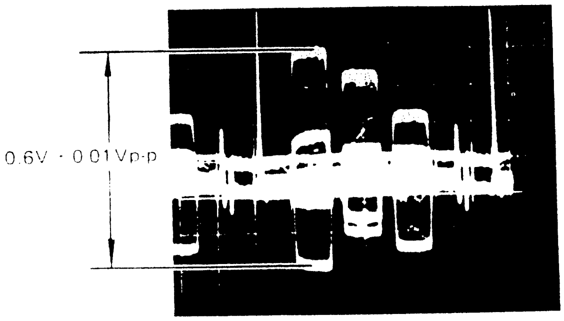
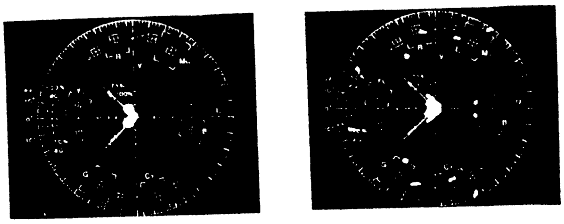


Fig. 5-2-23

(16) Spot correction offset adjustment

Test point:	Video output connector	
Adjust:	VR3 (CORRECTION OFFSET)	CCD drive board

- o Connect the Video Output Connector to the vectorscope.
- o Cap on the lens.
- o While observing the vectorscope, adjust VR3 (SPOT CORRECTION OFFSET) so that the vector positions at the center of the vectorscope. (Fig. 5-2-24)



NO GOOD GOOD

Fig. 5-2-24

(17) CCD bias fine adjustment

Test point:	TP7 (VIDEO OUT)	Process board
Adjust:	VR1 (CCD BIAS)	CCD drive board
Observe:	Color video monitor	

- o Aim the camera at a 40-watt lamp placed in front of dark background. (Fig. 5-2-25)

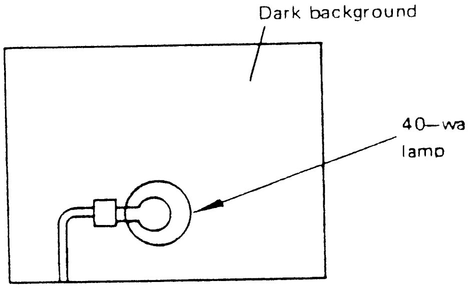
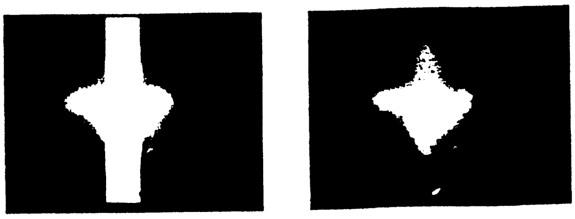


Fig. 5-2-25

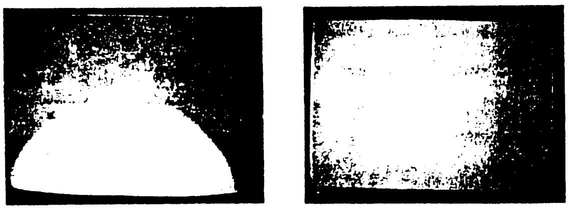
- o Turn the Auto Iris Control VR2 on the Control board on the side of camera fully clockwise to the OPEN position.
- o Adjust VR1 (CCD BIAS) so that the blooming and the noise are minimized. (Fig. 5-2-26)



NO GOOD GOOD

Fig. 5-2-26

- o Set the SES/Normal Selection Switch SW1 on the Microprocessor board to the upper (SES) position.
- o Aim the camera at the white chart/paper.
- o Confirm that there is no shadow (caused by the insufficient transfer of charge) at the lower portion of picture. If it is observed, carefully adjust VR1 (CCD BIAS) so that the shadow just disappears from the screen. (Fig. 5-2-27)



NO GOOD GOOD

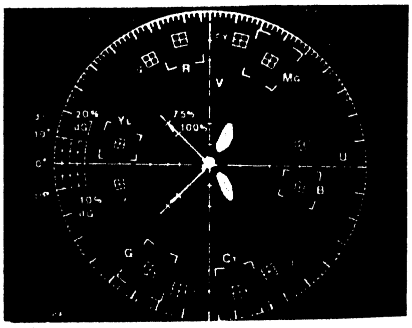
Fig. 5-2-27

- o Set the SES/Normal Selection Switch SW1 to the lower (NORMAL) position
- o Aim the camera at the gray scale chart.
- o Place the 1/8 ND filter in front of lens and confirm that the gray scale waveform at TP7 (VIDEO OUT) is not suppressed.
- o Set the Auto Iris Control VR2 to the center detent position.

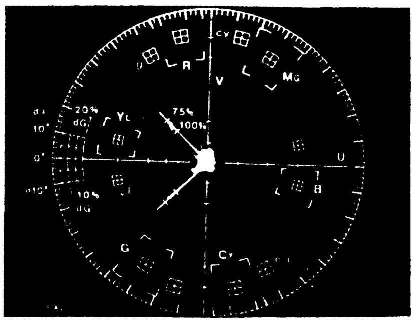
(18) White balance preset adjustment

Test point:	Video output monitor	
Adjust:	VR1 (ATW R GAIN)	VIC2/Process board
	VR2 (ATW B GAIN)	VIC2/Process board
	VR3 (R PRESET)	VIC2/Process board
	VR4 (B PRESET)	VIC2/Process board
	VR1 (R GAIN)	Audio board
	VR2 (B GAIN)	Audio board

- o Connect the Video Output Connector to the vectorscope.
- o Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- o Adjust the R GAIN VR1 on the Audio board on the side of the camera so that the vector stays at the same position even if VR1 (ATW R GAIN) on the VIC2/Process board is turned.
- o Adjust the B GAIN VR2 on the Audio board on the side of the camera so that the vector stays at the same position even if VR2 (ATW B GAIN) on the VIC2/Process board is turned.
- o Adjust VR3 (R PRESET) and VR4 (B PRESET) on the VIC2 of the Process board so that the vector positions at the center of the vectorscope. (Fig. 5-2-28)



NO GOOD



GOOD

Fig. 5-2-28

(19) Video level adjustment

Test point:	TP7 (VIDEO OUT)	Process board
Adjust:	VR6 (YH GAIN)	Process board

- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to TP7 (VIDEO OUT).
- o Set the oscilloscope to H. rate.
- o Adjust VR6 (YH GAIN) for 0.7V ± 0.05V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-29)

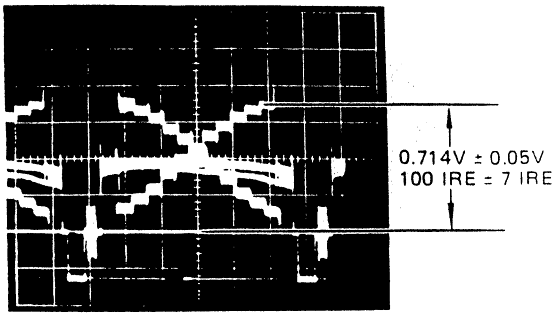


Fig. 5-2-29

(20) Level indicator adjustment

Test point:	TP2 (PREVIDEO-2)	Process board
Adjust:	VR2 (ZEBRA LEVEL)	Power/sync board
Observe :	1" viewfinder	

- o Connect the 1" viewfinder to the camera unit.
- o Set the Level Indicator Switch SW3 on the Power/sync board to the upper (ON) position
- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to TP2 (PREVIDEO-2) on the Process board and set the oscilloscope to H. rate.
- o Adjust the Auto Iris Control VR2 on the Control board so that the signal level from the blanking level to the top step of the gray scale waveform is 0.9V ± 0.05V. (Fig. 5-2-30)

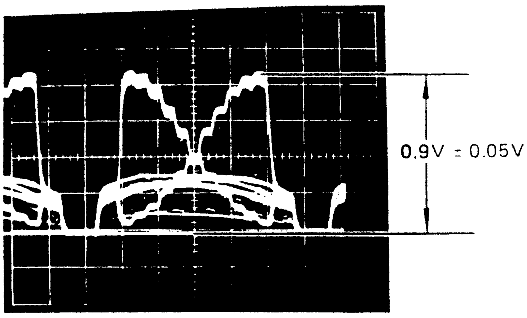


Fig. 5-2-30

- o While observing the 1" viewfinder, adjust VR2 (ZEBRA LEVEL) so that the top and second step of gray scale chart shows the zebra pattern.
- o Set the Auto Iris Control VR2 to the center detent position.

(21) Burst reference phase adjustment

Test point:	Video output connector	
Adjust:	CT1 (BURST REFERENCE PHASE)	VIC1/Process board

- o Mount the RCU adaptor WV-AD37 on the camera unit.
- o Supply the DC power to the RCU adaptor using the remote control unit (RCU) WV-RC35 or an external +12V power source.
- o Set the DC Power Selection Switch SW2 on the Audio board on the side of camera to the EXT position.
- o Connect the Video Output Connector of the RCU adaptor to the color video monitor through the A input connector of vectorscope.
- o Supply the color bar or black burst signal to the Gen-lock Input Connector of the RCU adaptor through the B input connector of vectorscope. (Fig. 5-2-31)

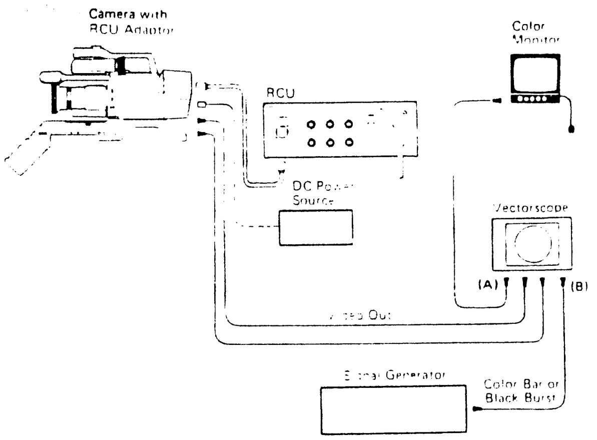


Fig. 5-2-31

- o Select the A input signal on the vectorscope and lock the vector by the B input signal.
- o Set the Color Bar/Camera Selection Switch on the RCU adaptor to the BAR position.
- o Adjust the Phase Control of the vectorscope so that the burst vectors position on the burst axes of the vectorscope and note the phase of the burst vectors. (Fig. 5-2-32)

  Note : Do not touch the Phase Control of the vectorscope until the adjustment of CT1 (BURST REFERENCE PHASE) is completed.

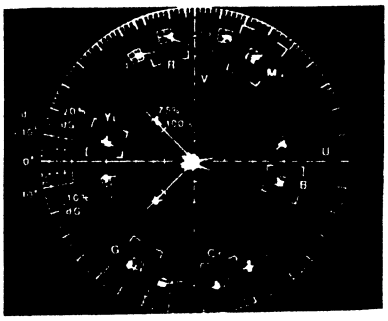
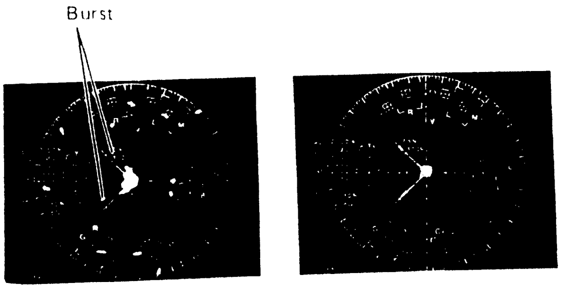


Fig. 5-2-32

- o Set the Color Bar/Camera Selection Switch on the RCU adaptor to the CAMERA position.
- o Adjust CT1 (BURST REFERENCE PHASE) on the VIC1 of the Process board so that the burst vectors position on the noted positions on the vectorscope. (Fig. 5-2-33)



NO GOOD **GOOD**

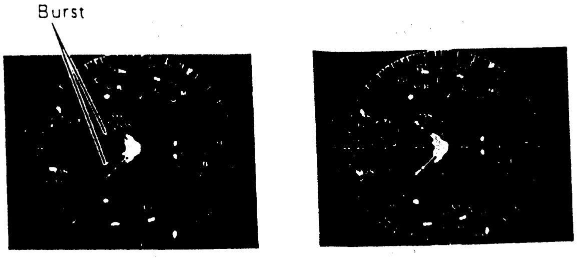
Fig. 5-2-33

- o Disconnect the RCU adaptor from the camera.

(22) Burst and chroma adjustment

Test point:	Video output connector	
Adjust:	VR2	VIC1/Process board
	(CHROMA GAIN)	
	VR3	VIC1/Process board
	(BURST GAIN)	
	VR4	VIC1/Process board
	(BURST 90° PHASE)	
	VR5	Process board
	(B-Y_L GAIN)	
	VR1	VIC1/Process board
	(R MATRIX)	
	VR7	Process board
	(CHROMA CLIP)	
	CT2	VIC1/Process board
	(CHROMA PHASE)	

- o Connect the Video Output Connector to the vectorscope.
- o Aim the camera at the color chart so that the chart fully occupies the raster of the color video monitor.
- o Adjust the Phase Control of the vectorscope so that the burst vectors position on the burst axes on the vectorscope. If not, adjust VR3 (BURST GAIN) and VR4 (BURST 90° PHASE) so that the burst vectors position at 75% on the burst axes. (Fig. 5-2



NO GOOD **GOOD**

Fig. 5-2-34

- o Turn VR7 (CHROMA CLIP) fully clockwise to release the chroma clipping.
- o Adjust VR2(CHROMA GAIN) on the VIC1/Process board so that the red vector is 210% ± 25% as compares to the burst vector on the vectorscope. (Fig. 5-2-35)

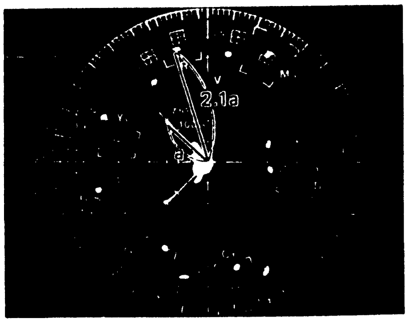


Fig. 5-2-35

- o Adjust VR5 (B-Y_L GAIN) on the Process board so that the yellow vector is 190% ± 25% as compares to the burst vector. (Fig. 5-2-36)

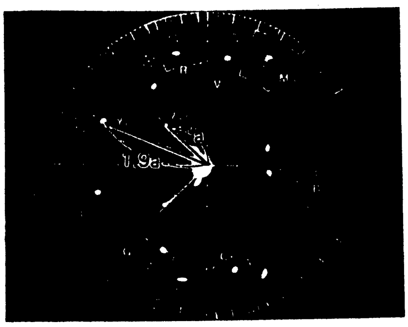


Fig. 5-2-36

- o Set the vectorscope to the NTSC mode and adjust the Phase Control of the vectorscope so that burst vectors coincide each other. Adjust CT2 (CHROMA PHASE) so that the red vectors for odd and even field coincide each other and adjust VR6 (R MATRIX) so that the phase of red vectors becomes 102° ± 5°. (Fig. 5-2-37)

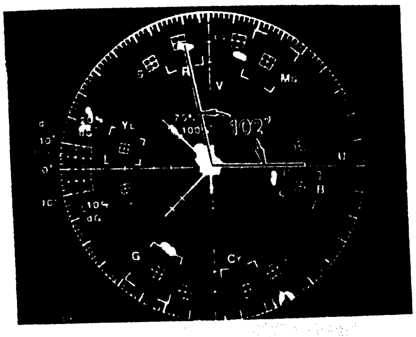


Fig. 5-2-37

o Repeat adjusting VR2 (CHROMA GAIN), VR5 (B-Y_L GAIN), CT2 (CHROMA PHASE) and VR1 (R MATRIX) so that the red vector and the yellow vector are 210% ± 25% and 190% ± 25% respectively as compare to the burst vector and the phase of red vector is 102° ± 5°. (Fig. 5-2-38)

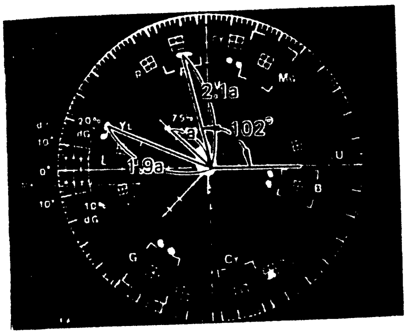


Fig. 5-2-38

o Mount the ATW sensor to the ATW sensor connector on the camera or on the viewfinder mounting angle (Fig. 5-2-41 and Fig. 5-2-42) and set the White Balance Selection Switch to the lower (ATW) position.

o Turn VR2 (R ATW ADJ) on the ATW VIC-1 board fully clockwise and then adjust VR7 (CHROMA CLIP) so that the red vector is clipped at 233% ± 5% as compares to the burst vector. (Fig. 5-2-39) After adjusting VR7, readjust VR2 while referring to (3) White balance sensor adjustment on page 2-26.

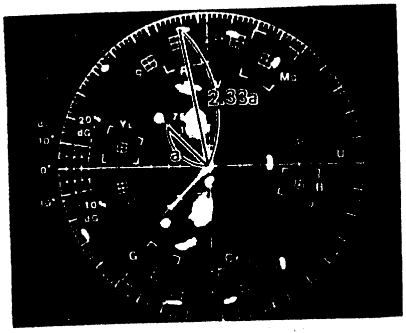


Fig. 5-2-39

(23) Character size adjustment

Adjust:	VR1 (CHARACTER SIZE)	Microprocessor board
Observe:	Color video monitor	

o Mount the grip/shoulder pad on the camera by sliding back the grip/shoulder pad after engaging the connectors on the camera and grip/shoulder pad.

o Open the key board cover on the grip arm.

o Press the TITLE button and then SET button to display the dots or the title on the color video monitor. (Fig. 5-2-40-1)

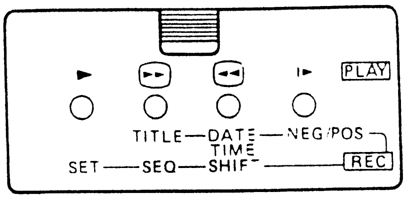


Fig. 5-2-40-1

o Adjust VR1 (CHARACTER SIZE) so that the right side dot or character positions at the center of the color video monitor. (Fig. 5-2-40-2)

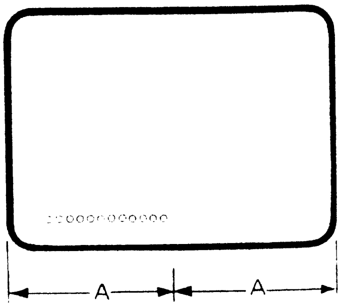


Fig. 5-2-40-2

(24) Time frequency adjustment

Test point:	TP1 (TIME FREQ.)	Microprocessor board
Adjust:	CT1 (TIME FREQ. ADJ)	Microprocessor board

o Connect the frequency counter to TP1 (TIME FREQ.).

Note : The frequency counter should read the frequency of 0.01Hz.

o Adjust CT1 (TIME FREQ. ADJ) so that the frequency at TP1 is as shown in the Table.

Room Temperature	Time Frequency(Hz)
From 5°C to less than 8°C	32767.607 ± 0.03
From 8°C to less than 11°C	32767.688 ± 0.03
From 11°C to less than 14°C	32767.803 ± 0.03
From 14°C to less than 17°C	32767.885 ± 0.03
From 17°C to less than 31°C	32767.967 ± 0.03
From 31°C to less than 34°C	32767.885 ± 0.03
From 34°C to less than 36°C	32767.803 ± 0.03

5-2-2 Auto Tracing White-Balance (ATW) Adjustment

- o Mount the ATW sensor to the ATW sensor connector on the camera or on the viewfinder mounting angle. (Fig. 5-2-41 and Fig. 5-2-42)

Note : Do not adjust the Auto Tracing White-Balance Adjustment under the fluorescent lamp.

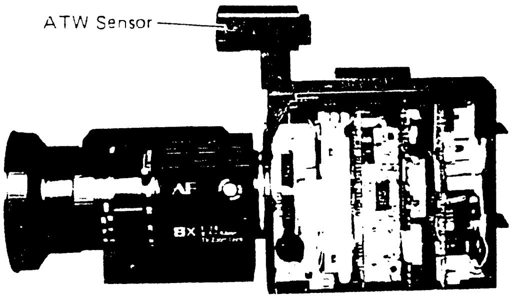


Fig. 5-2-41

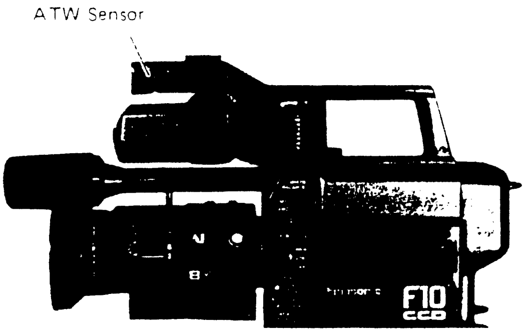


Fig. 5-2-42

(1) ATW low light detect level adjustment

Test point:	TP1 (LOW LIGHT DETECT)	ATW VIC1 board
Adjust:	VR1 (LOW LIGHT DETECT)	ATW VIC1 board

- o Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- o Connect the oscilloscope to TP1 (LOW LIGHT DETECT).
- o Set the oscilloscope to V rate
- o Set the 1/64 ND filter (1/2 ND filter + 1/4 ND filter + 1/8 ND filter) in front of the ATW sensor.
- o Adjust VR1 (LOW LIGHT DETECT) so that the waveform as shown in Fig. 5-2-43 just appears TP1 (LOW LIGHT DETECT).

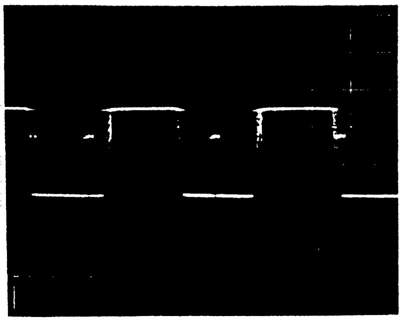


Fig. 5-2-43

- o Set the 1/32 ND filter (1/4 ND filter + 1/8 ND filter) in front of the ATW sensor, and confirm that the waveform at TP1 disappears.

  If not, readjust VR1 (LOW LIGHT DETECT) so that the waveform as shown in Fig. 5-2-43 appears with the 1/64 ND filter and disappears with the 1/32 ND filter.

(2) White balance preset fine-adjustment

Test point:	Video output connector	
Adjusts:	VR3 (R PRESET)	VIC2/Process board
	VR4 (B PRESET)	VIC2/Process board

- o Connect the Video Output Connector to the vectorscope.
- o Set the White Balance Selection Switch to the AWC position and turn OFF the power switch of the power supply or AC adaptor once to reset the white balance.
- o Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- o Confirm that the vector positions at the center of the vectorscope. If not, Adjust VR3 (R PRESET) and VR4 (B PRESET) on the VIC2 of the Process board so that the vector positions at the center of the vectorscope. (Fig. 5-2-44)

  Note : If more than one vector appears, adjust the controls so that the center amang vectors positions at center of the vectorscope.

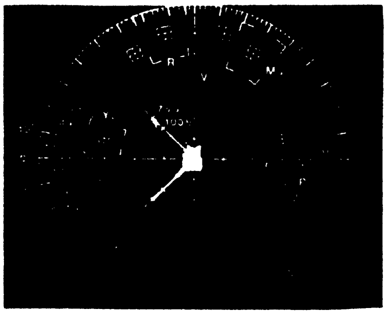


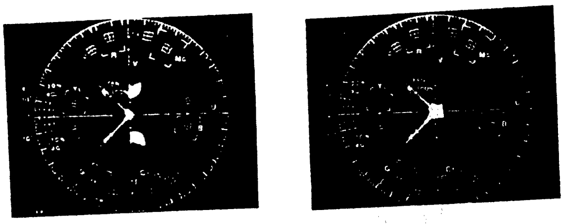
Fig. 5-2-44

(3) White balance sensor adjustment

Test point:	Video output connector	
Adjusts	VR2 (R ATW ADJ)	ATW VIC1 board
	VR3 (B ATW ADJ)	ATW VIC1 board

- o Set the White Balance Selection Switch to the ATW position.
- o Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- o Connect the Video Output Connector to the vectorscope.
- o Slowly adjust VR2 (R ATW ADJ) and VR3 (B ATW ADJ) so that the vector on the vectorscope positions at the center of vectorscope. (Fig. 5-2-45)

  Note : If more than one vector appears, adjust the controls so that the center amang vectors positions at center of the vectorscope.



NO GOOD **GOOD**

Fig. 5-2-45

(4) ATW sensor gain adjustment

Test point:	Video output connector	
Adjusts	VR1 (ATW R GAIN)	VIC2/Process board
	VR2 (ATW B GAIN)	VIC2/Process board

- o Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- o Set the White Balance Selection Switch to the ATW position.
- o Set the color temperature conversion filter which converts 32000°K to 5200°K in front of the lens and faceplate of ATW sensor.

  Note : If there is no color conversion filter, the ATW sensor gain can roughly be adjusted by using the outdoor light.
- o Adjust VR1 (ATW R GAIN) and VR2 (ATW B GAIN) so that the vector on the vectorscope positions at the center of vectorscope. (Fig. 5-2-46)

  Note : If more than one vector appears, adjust the controls so that the center amang vectors positions at center of the vectorscope.

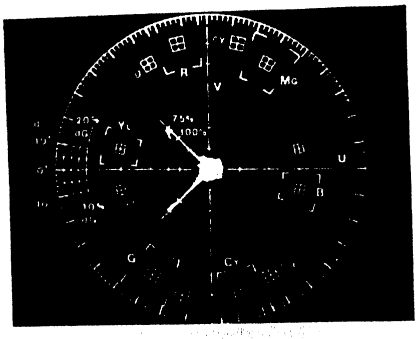


Fig. 5-2-46

- o Remove the color temperature conversion filter from the front of the lens and faceplate of ATW sensor.
- o Confirm that the vector on the vectorscope positions at the center of vectorscope. If not, repeat adjusting the stop (3) and (4) of auto tracing white balance adjustment.

5-2-3 Auto Focus Adjustment for WV-LZ14/8AF

- o Disassemble the Auto Focus Lens Unit according to Section 2-2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.
- o Disconnect the connect CN5 on the Auto focus board.
- o Set VR5 (BPF PHASE) and VR7 (LOW LEVEL DET) to the mechanical center. (Fig. 5-2-51)

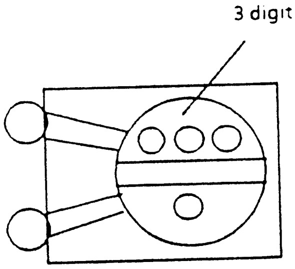


FIG. 5-2-51

(1) High frequency amp offset adjustment

Test point:	TP1 (A/F OFFSET)	Auto focus board
Adjust:	VR1 (A/F OFFSET)	Auto focus board

- o Set the Auto/Manual Focus Selection Switch on the lens to the MANU (manual) position.
- o Cap on the lens.
- o Turn the zoom lever fully to the MACRO position.
- o Connect the oscilloscope to TP1 (A/F OFFSET) and set oscilloscope to H.rate.

- o Set the input of the oscilloscope to the DC-coupled.
- o Adjust VR1 (A/F OFFSET) so that the DC level of waveform is 3.3 ± 0.1V. (Fig. 5-2-52)

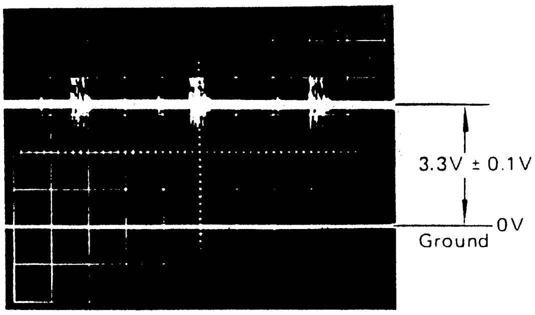


Fig. 5-2-52

(2) Hall-amp adjustment

Test points:	TP2 (PREVIDEO-2)	Process board
	TP4 (HALL OUT)	Auto focus board
Adjusts:	VR8 (HALL OUT OFFSET)	Auto focus board
	VR9 (HALL OUT GAIN)	Auto focus board

- o Set the Auto/Manual Focus Selection Switch on the lens to the MANU (manual) position.
- o Aim the camera at the white chart/paper illuminated by 140 footcandles (1400 lux).
- o Push the Iris Selection/Manual Control Knob on the lens to the AUTO position. (Fig. 5-2-53)

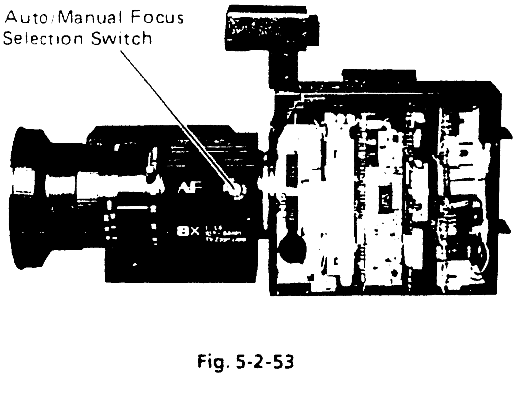


Fig. 5-2-53

- o Connect the oscilloscope to TP2 (PREVIDEO-2) on the Process board of the camera unit and set the oscilloscope to H.rate.
- o Note the signal level at TP2. (Fig. 5-2-54)

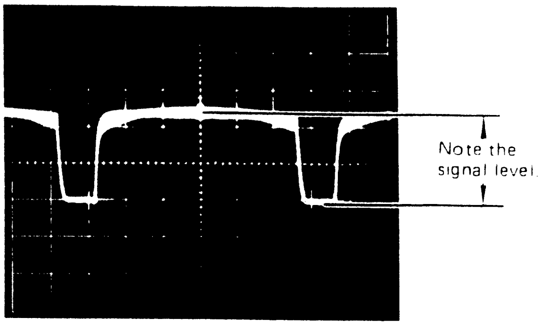


Fig. 5-2-54

- o Adjust the illumination as follows.
  - . Set the 1/16 ND filter (1/2 ND filter + 1/8 ND filter) in front of the lens.
  - . Pull the Iris Selection/Manual Control Knob to the MANUAL position and turn it fully clockwise to the OPEN position.
  - . Increase the illumination on the white chart/paper so that the signal level at TP2 (PREVIDEO-2) on the Process board is noted value. (Fig. 5-2-55)

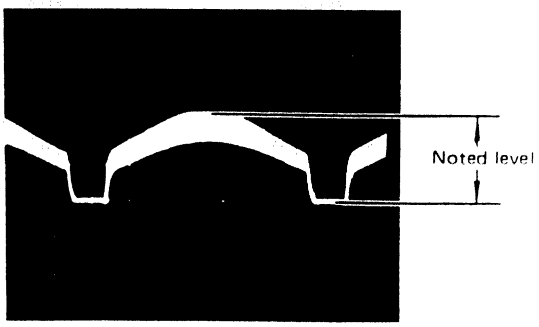


Fig. 5-2-55

- o Remove the 1/16 ND filter and push the Iris Selection/Manual Control Knob to the AUTO position.
- o Connect the digital voltmeter (DVM) to TP4 (HALL OUT) on the Auto focus board.
- o Adjust VR8 (HALL OUT OFFSET) for 1.0V ± 0.02V.
- o Cap on the lens and adjust VR9 (HALL OUT GAIN) for 3.5V ± 0.05V at TP4.
- o Repeat adjusting above steps so that the voltage at TP4 is 1.0V ± 0.02V at the lens uncapped and 3.5V ± 0.05V at the lens capped.
- o Remove the lens cap and adjust VR8 (HALL OUT OFFSET) for 2.05V ± 0.02V.

(3) Noise clip level adjustment

Test piont:	TP2 (CLIP LEVEL)	Auto focus board
Adjust:	VR2 (CLIP LEVEL)	Auto focus board

- o Set the Auto/Manual Focus Selection Switch on the lens to the MANU (manual) position.
- o Aim the camera at the white/gray chart illuminated by 40 footcandles (400 lux) so that the chart fully occupies the color video monitor. (Fig. 5-2-56)

  Note : The boundary of white/gray chart positions at the center of screen.

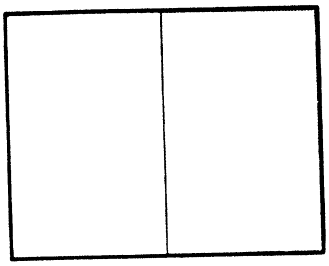


Fig. 5-4-56

- o Connect the oscilloscope to TP2 (CLIP LEVEL) and set the oscilloscope to V rate.
- o Adjust the lens focus so that the signal level at TP2 is maximum. (Fig. 5-2-57)

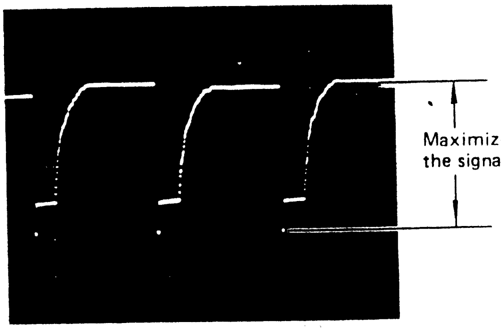


Fig. 5-4-57

- o Adjust VR2 (CLIP LEVEL) so that the signal level is 0.4Vp-p (+0.02Vp-p, -0.04Vp-p). (Fig. 5-2-58)

  Note : If there is level difference at the top of signal waveform, adjust for the average.

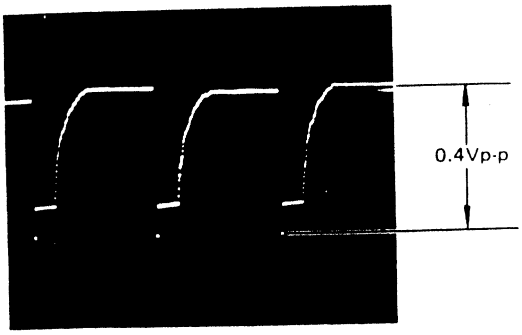


Fig. 5-4-58

(4) Bi-Molf level adjustment

Test point:	TP11 (BI-MOLF)	Auto focus board
Adjusts:	VR3 (BI-MOLF OFFSET)	Auto focus board
	VR4 (BI-MOLF GAIN)	Auto focus board

- o Set the Auto/Manual Focus Selection Switch on the lens to the AUTO position.
- o Aim the camera at the white/black chart illuminated by 40 footcandles (400 lux) so that the chart fully occupies the color video monitor. (Fig. 5-2-59)

  Note : The boundary of white/black chart positions at the center of screen.

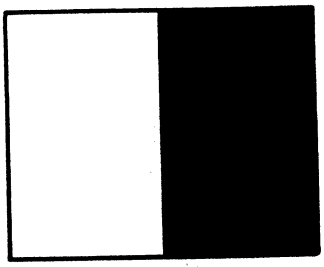


Fig. 5-4-59

- o Connect the oscilloscope at TP11 (BI-MOLF) and set the oscilloscope to H.rate.
- o Adjust the lens focus for the best focus and then turn the lens focus ring slightly to the infinity (∞) side.
- o Adjust VR3 (BI-MOLF OFFSET) for the maximum waveform at TP11. (Fig. 5-2-60)
- o Adjust VR4 (BI-MOLF GAIN) for the maximum waveform at TP11. (Fig. 5-2-60)
- o Adjust the lens focus for the maximum waveform at TP11. (Fig. 5-2-60)

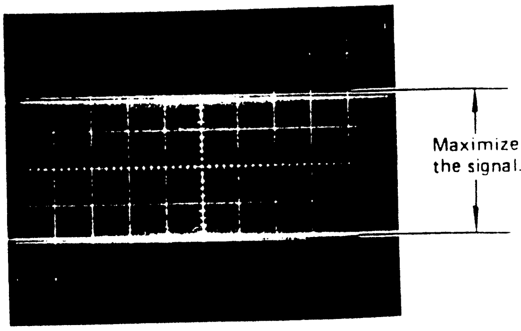


Fig. 5-4-60

- o Repeat adjusting VR3, VR4 and the lens focus for the maximum waveform at TP11.

- o Readjust VR3 (BI-MOLF OFFSET) for 2.7 ± 0.3Vp-p. (Fig. 5-2-61)

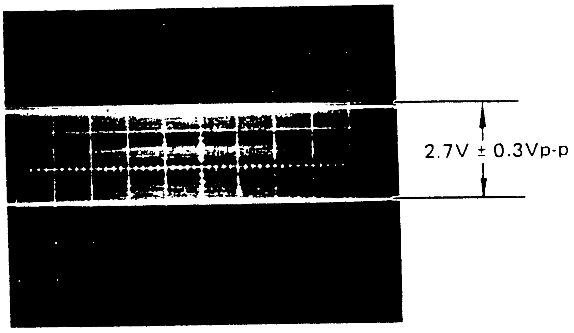


Fig. 5-2-61

- o Increase the illumination to 600 footcandles (6000 lux).
- o Adjust the lens focus for the best focus then slightly turn the focus ring to the infinity (∞) side for the maximum waveform at TP11.
- o Confirm that the waveform at TP11 is 3.3 ± 0.3Vp-p. (Fig. 5-2-62) If not, readjust VR3 and VR4.

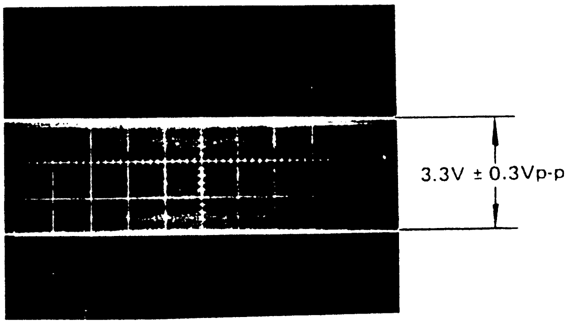


Fig. 5-2-62

(5) Low light detection adjustment

Adjust:	VR7 (LOW LEVEL DET)	Auto focus board
Observe:	1" viewfinder	

- o Connect the 1" viewfinder to the camera unit.
- o Set the Auto/Manual Focus Selection Switch on the lens to the AUTO position.
- o Push the Auto Focus Zone/Push Auto Button so that the medium size of auto focus detecting zone is displayed on the 1" viewfinder screen. (Fig. 5-2-63)

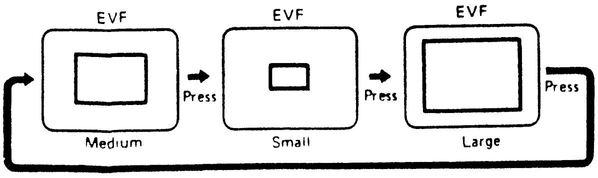


Fig. 5-2-63

- o Aim the camera at the white chart/paper illuminated by 40 footcandles (400 lux).
- o Set the 1/32 ND filter (1/4 ND filter + 1/8 ND filter) in front of the lens.
- o Adjust VR7 (LOW LEVEL DET) so that the auto focus detecting zone in the 1" viewfinder just starts blinking.
- o Set the 1/16 ND filter (1/2 ND filter + 1/8 ND filter) in front of the lens.
- o Confirm that the auto focus detecting zone stops blinking. If not, readjust VR7 (LOW LEVEL DET) so that the auto focus detecting zone in the viewfinder blinks with 1/32 ND filter and stops blinking with 1/16 ND filter.

(6) BPF phase adjustment

Test point:	Pin 1 of CN5	Auto focus board
Adjust:	VR5 (BPF PHASE)	Auto focus board

- o Set the Auto/Manual Focus Selection Switch on the lens to the AUTO position.
- o Aim the camera at the white/black chart so that the chart fully occupies the color video monitor.
  Note : The boundary of the white/black chart positions at the center of the screen.
- o Connect the oscilloscope to pin 1 of connector CN5.
- o Turn the lens focus ring to the infinity (∞) position.
- o Turn VR5 (BPF PHASE) clockwise slowly and stop at a point where the pulse (A) is observed on the oscilloscope. (Fig. 5-2-64) Note the mechanical position of VR5 as A.

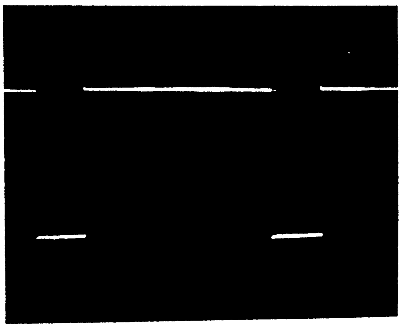


Fig. 5-2-64

- o Turn VR5 back slowly, the pulse (A) disappears and stop at a point where the pulse (B) is observed. (Fig. 5-2-65) Note the mechanical position of VR5 as B.
- o Set VR5 to the mechanical center between position A and B.

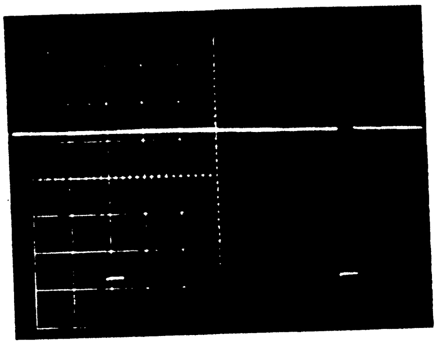


Fig. 5-2-65

(7) Hunting adjustment

Adjust:	VR6 (HUNTING ADJ)	Auto focus board
Observe:	Color video monitor	

- o Connect CN5 to the Auto focus board.
- o Set the Auto/Manual Focus Selection Switch on the lens to the AUTO position.
- o Aim the camera at the gray scale chart illuminated by 40 footcandles (400 lux).
- o Mechanically set VR5 (HUNTING ADJ) as shown below. (Fig. 5-2-66)

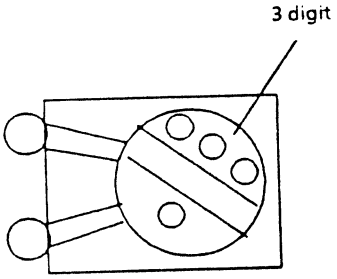


Fig. 5-2-66

- o Turn the focus ring about 1cm to defocus the picture in the auto focus operation and release the focus ring.
  Confirm that the number of hunting at the in-focus position is less than three times.
- o If not, turn VR5 slightly and confirm the above step.

5-2-4 1" Viewfinder Adjustment

- o The camera must be completely aligned before viewfinder adjustment is made.
- o Disassemble the 1" viewfinder according to Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.
- o Connect the 1" viewfinder to the viewfinder connector on the camera unit.
- o Refer to page 2-31 for the adjusting controls and test points.

(1) +8V adjustment

Test point:	TP2 (+8V)	EVF board
Adjust:	VR1 (+8V ADJ)	EVF board

- o Connect the digital voltmeter (DVM) to TP2 (+8V).
- o Adjust VR1 (+8V ADJ) for 8V ± 0.05V.

(2) AFC adjustment

Test point:	TP3 (AFC)	EVF board
Adjust:	VR3 (AFC, ADJ)	EVF board

- o Connect the digital voltmeter to TP3 (AFC).
- o Adjust VR3 (AFC ADJ) for +2.6V ± 0.1V.

(3) Picture tilt adjustment

Adjust:	Deflection coil
Observe:	Viewfinder

- o Loosen the deflection coil holding screw. (Fig. 5-2-71)
- o Observe the viewfinder and turn the deflection coil so that the image is straight.
- o Tighten the deflection coil holding screw.

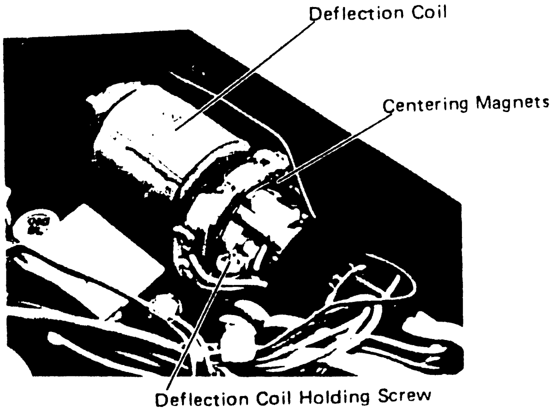


Fig. 5-2-71

(4) Centering magnets adjustment

Adjust:	Centering magnets
Observe:	Viewfinder

- o Aim the camera at the ball chart so that the chart fully occupies the raster of color video monitor and the center of chart positions the center of the color video monitor.
- o Adjust the centering magnets (See Fig.. 5-2-71) until the center of picture (raster) becomes to the center of the viewfinder screen. (Fig. 5-2-72)

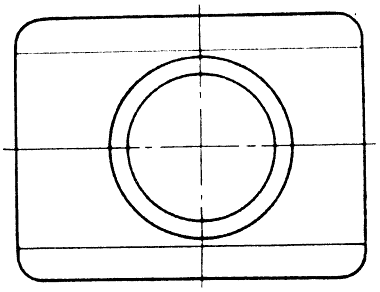


Fig. 5-2-72

(5) H and V size adjustment

Adjusts:	L6 (H.SIZE)	EVF board
	VR2 (V.SIZE)	EVF board
Observe:	Viewfinder	

- o Aim the camera at the ball chart so that the chart fully occupies the raster of color video monitor.
- o Adjust L6 (H.SIZE) so that the reference arrow head on the chart just disappears from the viewfinder screen. (Fig. 5-2-73)
- o Adjust VR2 (V.SIZE) so that the circle on the chart is as true circle as possible in the viewfinder. (Fig. 5-2-73)

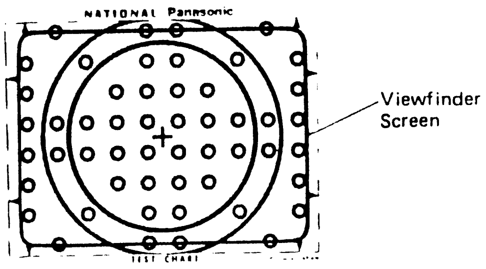

NATIONAL Panasonic
Viewfinder Screen
TEST CHART

Fig. 5-2-73

- o Confirm that the center of chart positions at the center of screen. If not, readjust the centering magnets.

(6) Contrast and bright adjustment

Adjusts:	VR5 (CONTRAST)	EVF board
	VR6 (BRIGHTNESS)	EVF board
Observe:	Viewfinder	

- o Aim the camera at the logarithmic gray scale chart.
- o Adjust VR5 (CONTRAST) and VR6 (BRIGHTNESS) for optimum picture gradation.

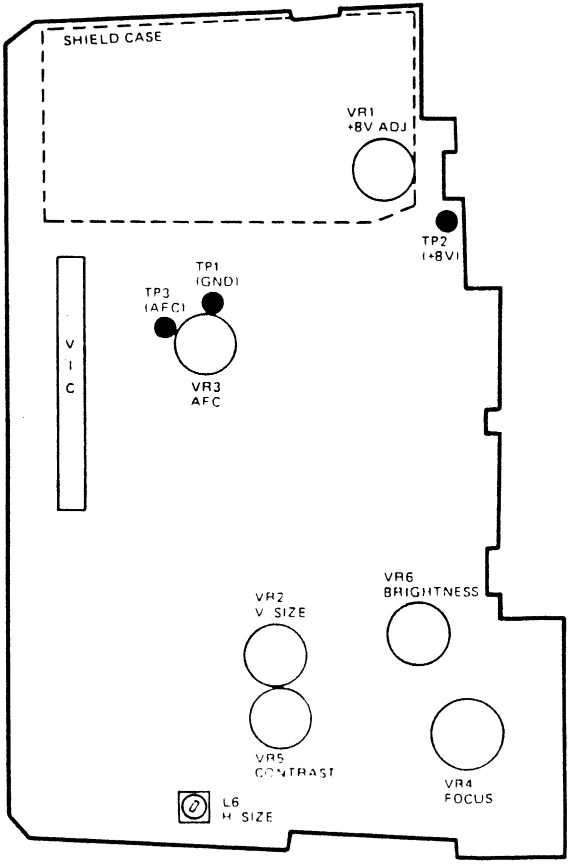
(7) Focus adjustment

Adjust:	VR4 (FOCUS)	EVF board
Observe:	Viewfinder	

- o Aim the camera at ball chart.
- o Adjust VR4 (FOCUS) for best resolution in the viewfinder.

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

EVF BOARD


SHIELD CASE
VR1 +8V ADJ
TP2 (+8V)
TP1 (GND)
TP3 (AFC)
V I C
VR3 AFC
VR2 V SIZE
VR6 BRIGHTNESS
VR5 CONTRAST
VR4 FOCUS
L6 H SIZE

Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

EXAMPLE:

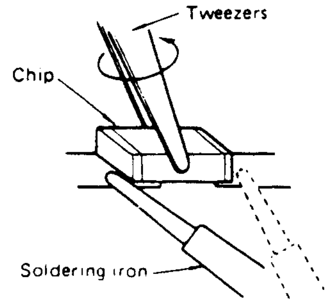
A1 ⟶ $10 \times 10^{1} = 100$ pF
N2 ⟶ $33 \times 10^{2} = 3300$ pF
S3 ⟶ $47 \times 10^{3} = 47000$ pF

4. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

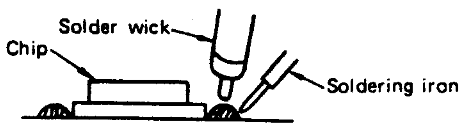
4-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note: Be careful not to damage other chips.

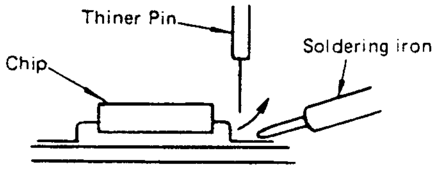

Tweezers
Chip
Soldering iron

4-2 Removal (IC)

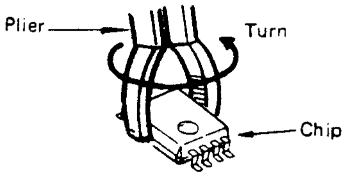
1. Add the solder wick and solder iron to each lead of the IC and remove solder.


Solder wick
Chip
Soldering iron

2. Add the solder iron to each lead of the IC and left each lead of the IC using thiner pin.

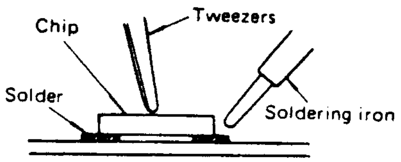

Thiner Pin
Soldering iron
Chip

3. Remove IC turning it with plier.

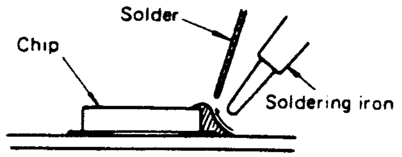

Plier
Turn
Chip

4-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.


Tweezers
Chip
Solder
Soldering iron

3. Solder both ends of chip (three leads for chip transistor).


Solder
Chip
Soldering iron

5-2-5 Gen-Lock Adaptor Adjustment

- **The gen-lock adaptor WV-AD36 does not have to be disassembled when adjusting the unit.**
- Mount the gen-lock adaptor on the camera.
- Connect the camera cable between the gen-lock adaptor and the power supply WV-PS01 or the AC adaptor WV-PS03 and set the DC Power Selection Switch to the EXT position.
- Connect the Video Output Connector of the gen-lock adaptor to the color video monitor through the A input connector of vectorscope.
- Supply the color bar or black burst signal to the Gen-lock Input Connector of the gen-lock adaptor through the B input connector of vectorscope. (Fig. 5-2-80)

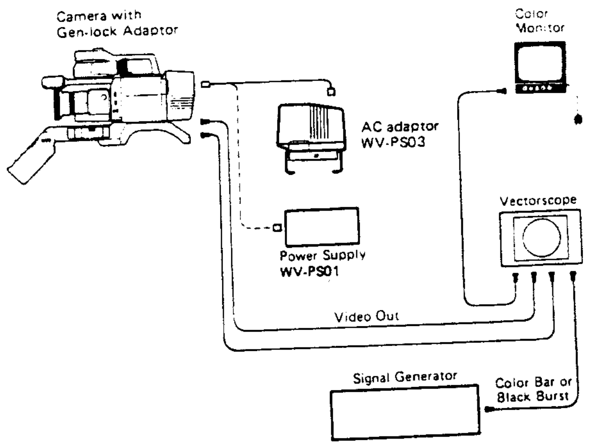
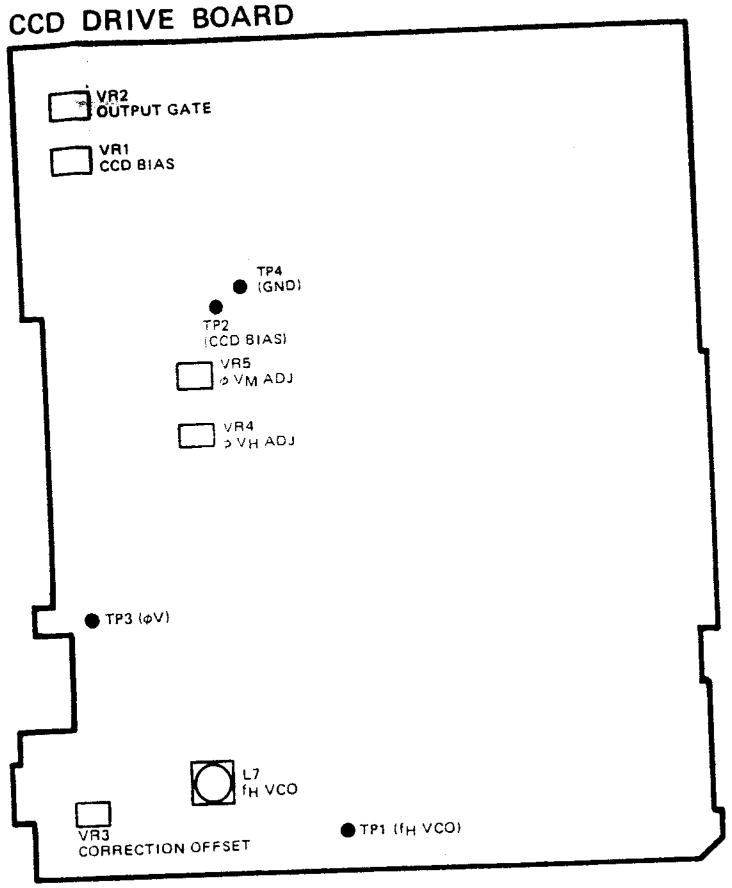
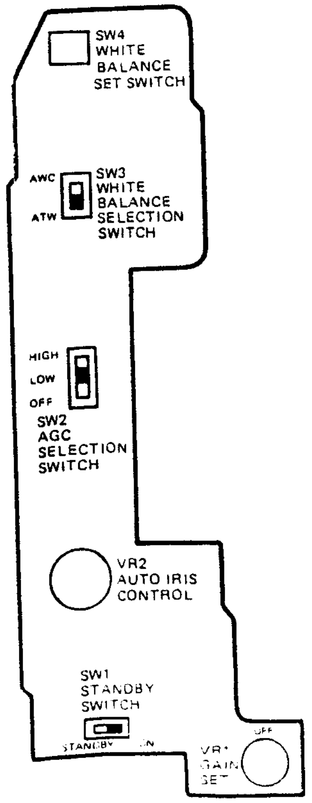

Camera with
Gen-lock Adaptor
Color
Monitor
AC adaptor
WV-PS03
Vectorscope
Power Supply
WV-PS01
Video Out
Signal Generator
Color Bar or
Black Burst

Fig. 5-2-80

CCD DRIVE BOARD

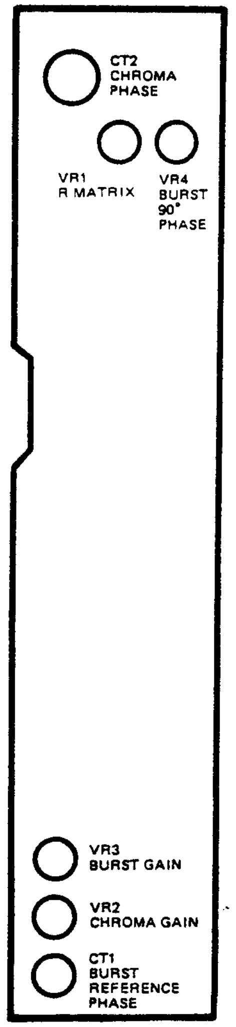

VR2
OUTPUT GATE
VR1
CCD BIAS
TP4
(GND)
TP2
(CCD BIAS)
VR5
φVM ADJ
VR4
φVH ADJ
TP3 (φV)
L7
fH VCO
VR3
CORRECTION OFFSET
TP1 (fH VCO)

CONTROL BOARD

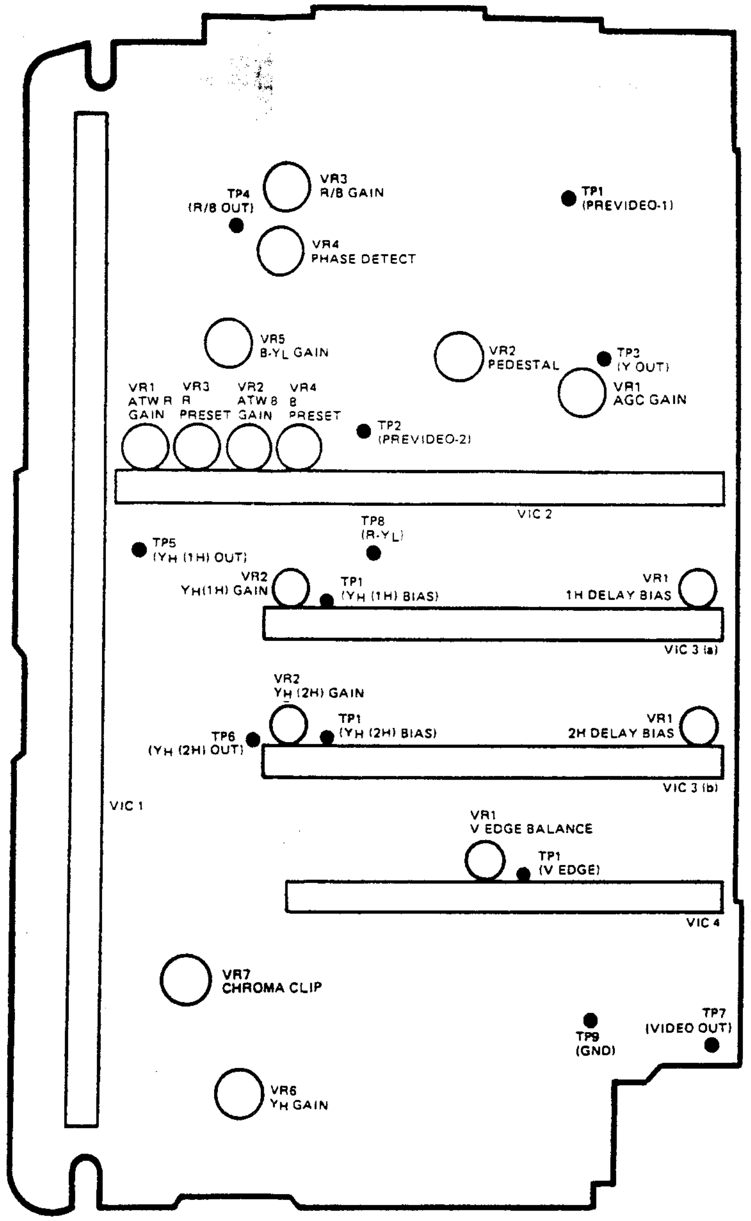

SW4
WHITE
BALANCE
SET SWITCH
AWC
ATW
SW3
WHITE
BALANCE
SELECTION
SWITCH
HIGH
LOW
OFF
SW2
AGC
SELECTION
SWITCH
VR2
AUTO IRIS
CONTROL
SW1
STANDBY
SWITCH
STANDBY
ON
OFF
VR1
GAIN
SET

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

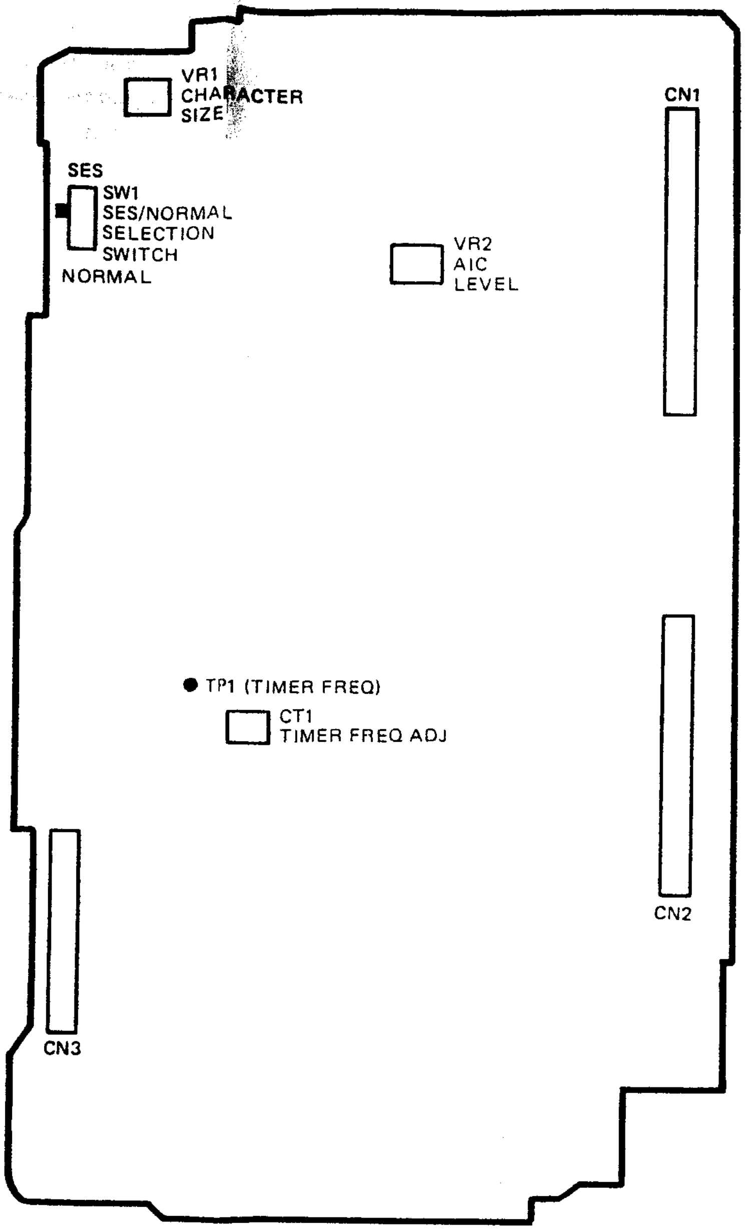
VIC 1


CT2
CHROMA
PHASE
VR1
R MATRIX
VR4
BURST
90°
PHASE
VR3
BURST GAIN
VR2
CHROMA GAIN
CT1
BURST
REFERENCE
PHASE

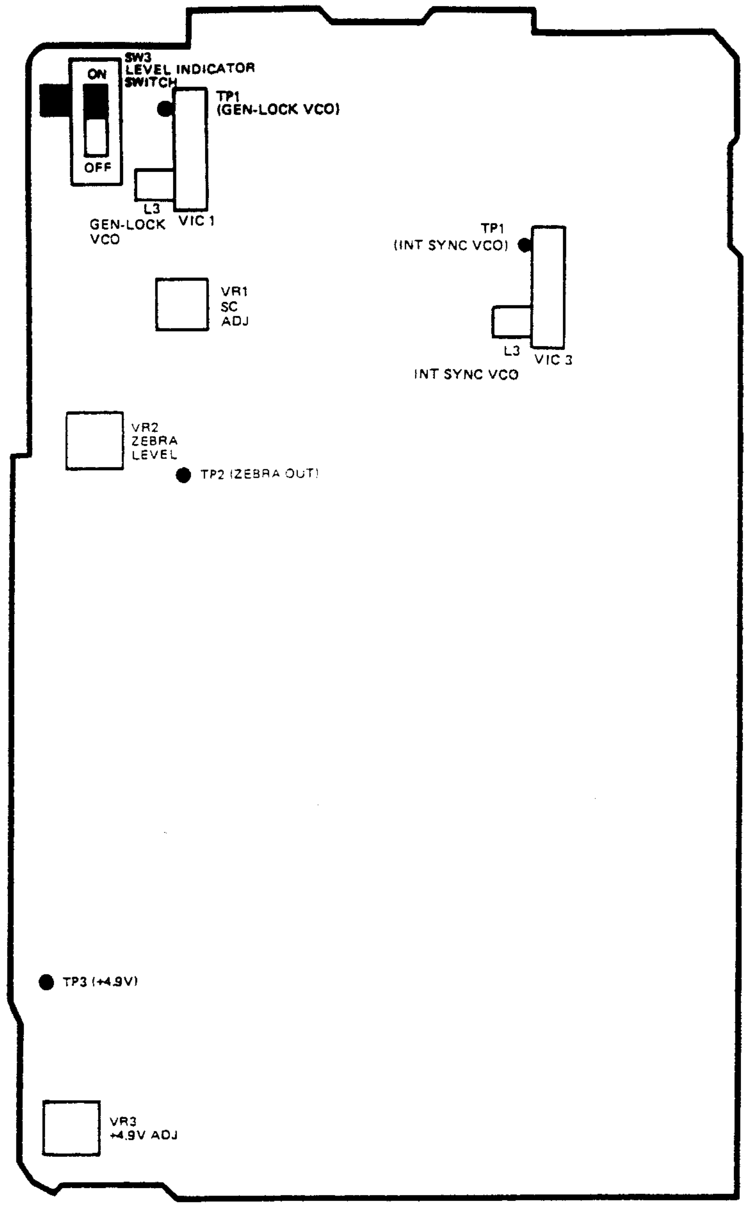
PROCESS BOARD


VR3
R/B GAIN
TP4
(R/B OUT)
TP1
(PREVIDEO-1)
VR4
PHASE DETECT
VR5
B-YL GAIN
VR2
PEDESTAL
TP3
(Y OUT)
VR1
AGC GAIN
VR1
ATW R
GAIN
VR3
R
PRESET
VR2
ATW B
GAIN
VR4
B
PRESET
TP2
(PREVIDEO-2)
VIC 2
TP8
(R-YL)
TP5
(YH (1H) OUT)
VR2
YH(1H) GAIN
TP1
(YH (1H) BIAS)
VR1
1H DELAY BIAS
VIC 3 (a)
VR2
YH (2H) GAIN
TP1
(YH (2H) BIAS)
TP6
(YH (2H) OUT)
VR1
2H DELAY BIAS
VIC 3 (b)
VIC 1
VR1
V EDGE BALANCE
TP1
(V EDGE)
VIC 4
VR7
CHROMA CLIP
TP9
(GND)
TP7
(VIDEO OUT)
VR6
YH GAIN

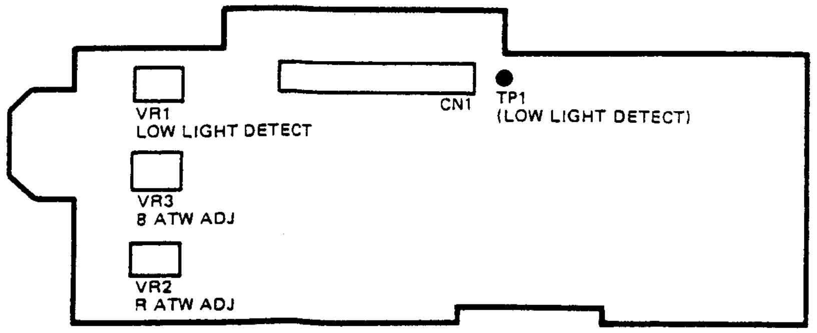
MICROPROCESSOR BOARD


VR1
CHARACTER
SIZE
CN1
SES
SW1
SES/NORMAL
SELECTION
SWITCH
NORMAL
VR2
AIC
LEVEL
TP1 (TIMER FREQ)
CT1
TIMER FREQ ADJ
CN2
CN3

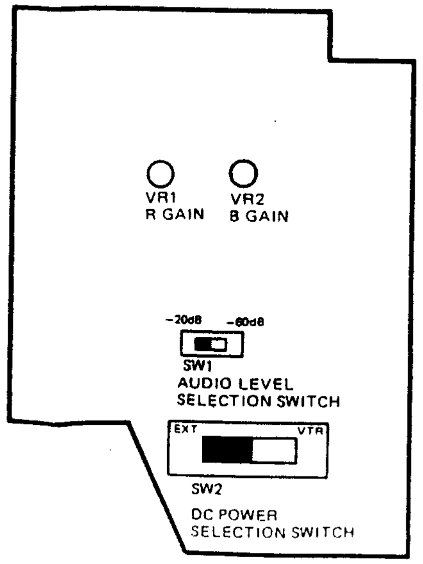
POWER/SYNC BOARD


SW3
LEVEL INDICATOR
SWITCH
ON
OFF
TP1
(GEN-LOCK VCO)
L3
GEN-LOCK
VCO
VIC 1
TP1
(INT SYNC VCO)
VR1
SC
ADJ
L3
VIC 3
INT SYNC VCO
VR2
ZEBRA
LEVEL
TP2 (ZEBRA OUT)
TP3 (+4.9V)
VR3
+4.9V ADJ

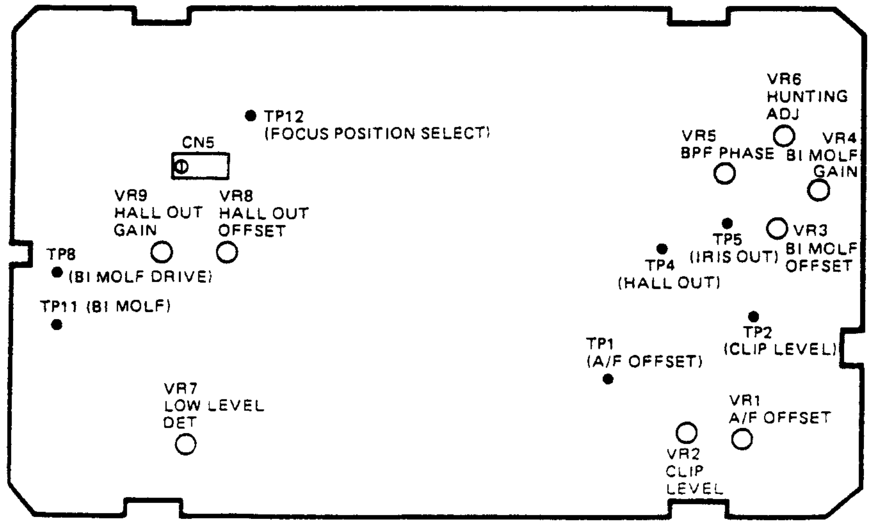
ATW VIC-1 BOARD


VR1
LOW LIGHT DETECT
CN1
TP1
(LOW LIGHT DETECT)
VR3
B ATW ADJ
VR2
R ATW ADJ

AUDIO BOARD


VR1
R GAIN
VR2
B GAIN
-20dB
-60dB
SW1
AUDIO LEVEL
SELECTION SWITCH
EXT
VTR
SW2
DC POWER
SELECTION SWITCH

WV-LZ14/8AF AUTO FOCUS BOARD


TP12
(FOCUS POSITION SELECT)
CN5
VR9
HALL OUT
GAIN
VR8
HALL OUT
OFFSET
TP8
(BI MOLF DRIVE)
TP11 (BI MOLF)
VR6
HUNTING
ADJ
VR5
BPF PHASE
VR4
BI MOLF
GAIN
TP5
(IRIS OUT)
VR3
BI MOLF
OFFSET
TP4
(HALL OUT)
TP2
(CLIP LEVEL)
TP1
(A/F OFFSET)
VR7
LOW LEVEL
DET
VR1
A/F OFFSET
VR2
CLIP
LEVEL

(1) Confirmation of horizontal phase adjustment

Test point:	Video output connector Gen-lock input connector	
Adjust:	VR1 (H PHASE)	Gen-lock adaptor board

- o Connect the dual traced oscilloscope to the Gen-lock Input Connector and the Video Output Connector to observe the gen-lock input signal and the video output signal.
- o Set the oscilloscope to H.rate.
- o Turn VR1 (H PHASE) on the side of the gen-lock adaptor clockwise and counterclockwise and confirm that the sync of gen-lock signal leads more than 0.1 µsec and lags more than 1.5 µsec with respect to the sync signal of video output signal. (Fig. 5-2-81)

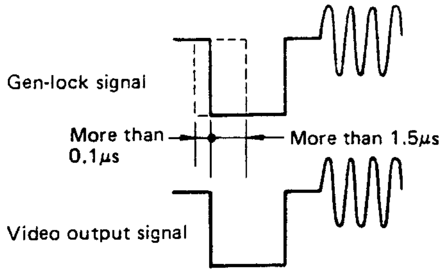

Gen-lock signal
More than 0.1µs
More than 1.5µs
Video output signal

Fig. 5-2-81

- o Adjust VR1 so that the leading edge of both sync signals are coincident.

(2) Confirmation of subcarrier phase adjustment

Test point:	Video output connector	
Adjust:	SW1 (SC PHASE COARSE SWITCH-1)	Gen-lock adaptor board
	SW2 (SC PHASE COARSE SWITCH-2)	Gen-lock adaptor board
	VR2 (SC PHASE FINE)	Gen-lock adaptor board
Observe:	Vectorscope	

- o Select the A input signal on the vectorscope and lock the vector by the B input signal.
- o Set SW1 (SC PHASE COARSE SWITCH-1) and SW2 (SC PHASE COARSE SWITCH-2) to the 0° position and turn VR2 (SC PHASE FINE) fully counterclockwise. (Fig. 5-2-82)
- o Confirm that the burst phase changes more than 90°, 180° and 270° when SW1 and SW2 are set to the 90°, 180° and 270° position. (Fig. 5-2-82)

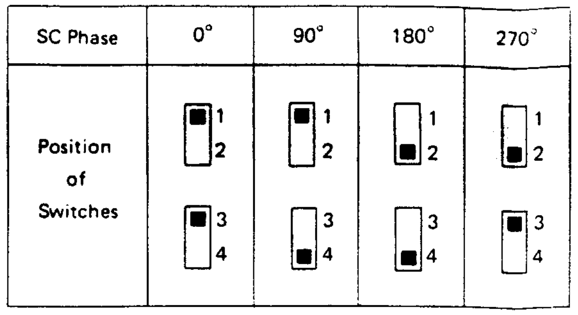
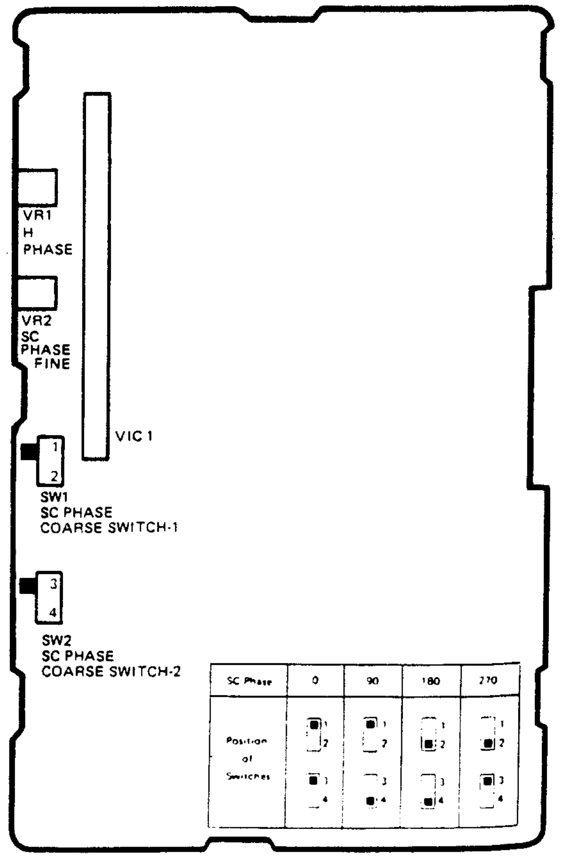

SC Phase
0°
90°
180°
270°
Position of Switches
1
2
3
4

Fig. 5-2-82

- o Confirm that the burst phase changes more than 90°, when VR2 is turned back. (The burst phase changes more than 360° by setting SW1, SW2 and VR1.)
- o Reset SW1 and SW2 to the 0° position and return VR2 fully counterclockwise.

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

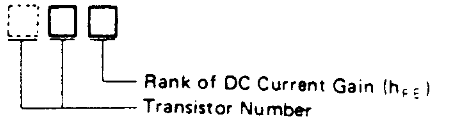
WV-AD36 GEN-LOCK ADAPTOR BOARD


VR1
H
PHASE
VR2
SC
PHASE
FINE
VIC 1
SW1
SC PHASE
COARSE SWITCH-1
SW2
SC PHASE
COARSE SWITCH-2
SC Phase
0
90
180
270
Position of Switches

CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.


Rank of DC Current Gain (h_{FE})
Transistor Number

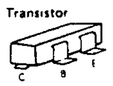
Transistor Number

Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

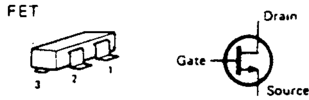
Example

WQ ⟶ 2SD602 – Q
YQ ⟶ 2SD601 – Q
1BS ⟶ 2SB814 – S

Appearance and Symbols


Transistor
C
B
E

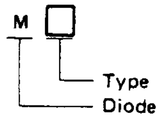
C: Collector
B: Base
E: Emitter


FET
3
2
1
Drain
Gate
Source

	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

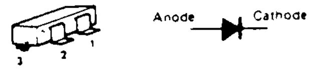
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.


M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

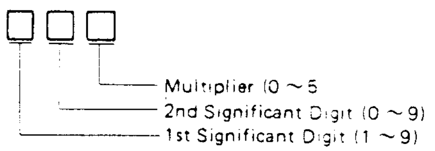
Appearance and Symbols


Anode
Cathode
3
2
1

	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers


Multiplier (0 ~ 5
2nd Significant Digit (0 ~ 9)
1st Significant Digit (1 ~ 9)

EXAMPLE:

330 ⟶ $33 \times 10^0 = 33$ ohms
561 ⟶ $56 \times 10^1 = 560$ ohms
123 ⟶ $12 \times 10^3 = 12$ kohms

Note: Zero ohm resistor (jumper chip is colored red or green.

4. Chip Capacitor

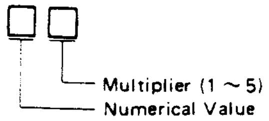
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 ⟶ 0.5 pF   2.5 ⟶ 2.5 pF
75 ⟶ 0.75 pF   33 ⟶ 33 pF
1 ⟶ 1 pF   82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.


Multiplier (1 ~ 5)
Numerical Value

Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

EXAMPLE:

A1 ——→ $10 \times 10^1 = 100$ pF

N2 ——→ $33 \times 10^2 = 3300$ pF

S3 ——→ $47 \times 10^3 = 47000$ pF

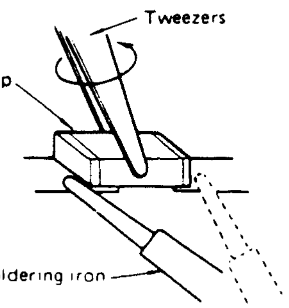
4. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

4-1 Removal (Transistor, Diode, Resistor and Capacitor)

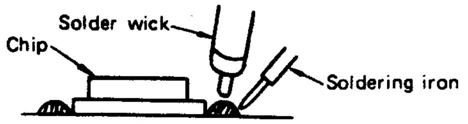
1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.

   Note: Be careful not to damage other chips.

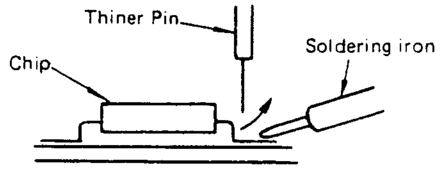

Tweezers
Chip
Soldering iron

4-2 Removal (IC)

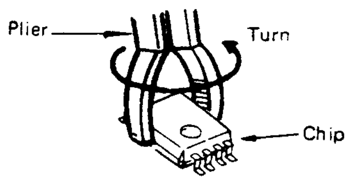
1. Add the solder wick and solder iron to each lead of the IC and remove solder.


Solder wick
Chip
Soldering iron

2. Add the solder iron to each lead of the IC and left each lead of the IC using thiner pin.

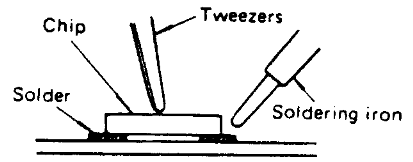

Thiner Pin
Soldering iron
Chip

3. Remove IC turning it with plier.

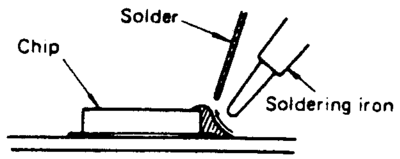

Plier
Turn
Chip

4-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.


Chip
Tweezers
Solder
Soldering iron

3. Solder both ends of chip (three leads for chip transistor).


Solder
Chip
Soldering iron

Service Manual

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views
Wiring Diagrams

System Camera
WVP-F10

1″ Electronic Viewfinder
WV-VF01

Gen-lock Adaptor
WV-AD36

8X Auto Focus Lens
WV-LZ14/8AF

Grip Shoulder
WV-GR12

12X Power Zoom Lens
WV-LZ14/12

CONTENTS

COMPOSITION 3-1

BLOCK DIAGRAM .... 3-2 ~ 3-4
- POWER/SYNC BOARD (WVP-F10) 3-4, 3-5
- AUDIO BOARD (WVP-F10) .... 3-6 ~ 3-9
- PROCESS BOARD (WVP-F10) .... 3-10 ~ 3-12
- CCD AND CCD DRIVE BOARD (WVP-F10) .... 3-13 ~ 3-15
- MICROPROCESSOR BOARD (WVP-F10) 3-16, 3-17
- AUTOFOCUS BOARD (WV-LZ14/8AF) 3-18, 3-19
- 1″ VIEWFINDER (WV-VF01) .... 3-20 ~ 3-22
- GEN-LOCK ADAPTOR (WV-AD36) ....

SCHEMATIC DIAGRAM .... 3-23 ~ 3-25
- CCD AND CCD DRIVE BOARD (WVP-F10) .... 3-30 ~ 3-33
- PROCESS BOARD (WVP-F10) .... 3-38 ~ 3-41
- MICROPROCESSOR BOARD (WVP-F10) .... 3-48 ~ 3-50
- POWER/SYNC BOARD (WVP-F10) .... 3-51 ~ 3-53
- AUDIO BOARD (WVP-F10) .... 3-58 ~ 3-60
- 1″ VIEWFINDER (WV-VF01) .... 3-61 ~ 3-63
- AUTOFOCUS BOARD (WV-LZ14/8AF) 3-67
- AUTOFOCUS LENS UNIT (WV-LZ14/8AF) .... 3-68 ~ 3-71
- MOTHER BOARD (WVP-F10) 3-78, 3-79
- GRIP SHOULDER (WV-GR12) .... 3-82 ~ 3-85
- GEN-LOCK ADAPTOR (WV-AD36) ....

CONDUCTOR VIEW .... 3-26 ~ 3-29
- CCD AND CCD DRIVE BOARD (WVP-F10) .... 3-34 ~ 3-37
- PROCESS BOARD (WVP-F10) .... 3-42 ~ 3-44
- MICROPROCESSOR BOARD (WVP-F10) .... 3-45 ~ 3-47
- POWER/SYNC BOARD (WVP-F10) 3-54, 3-55
- AUDIO BOARD (WVP-F10) 3-56, 3-57
- 1″ VIEWFINDER (WV-VF01) 3-64, 3-65
- AUTOFOCUS BOARD (WV-LZ14/8AF) .... 3-72 ~ 3-74
- MOTHER BOARD (WVP-F10) 3-79, 3-80
- GRIP SHOULDER (WV-GR12) .... 3-86 ~ 3-88
- GEN-LOCK ADAPTOR (WV-AD36) ....

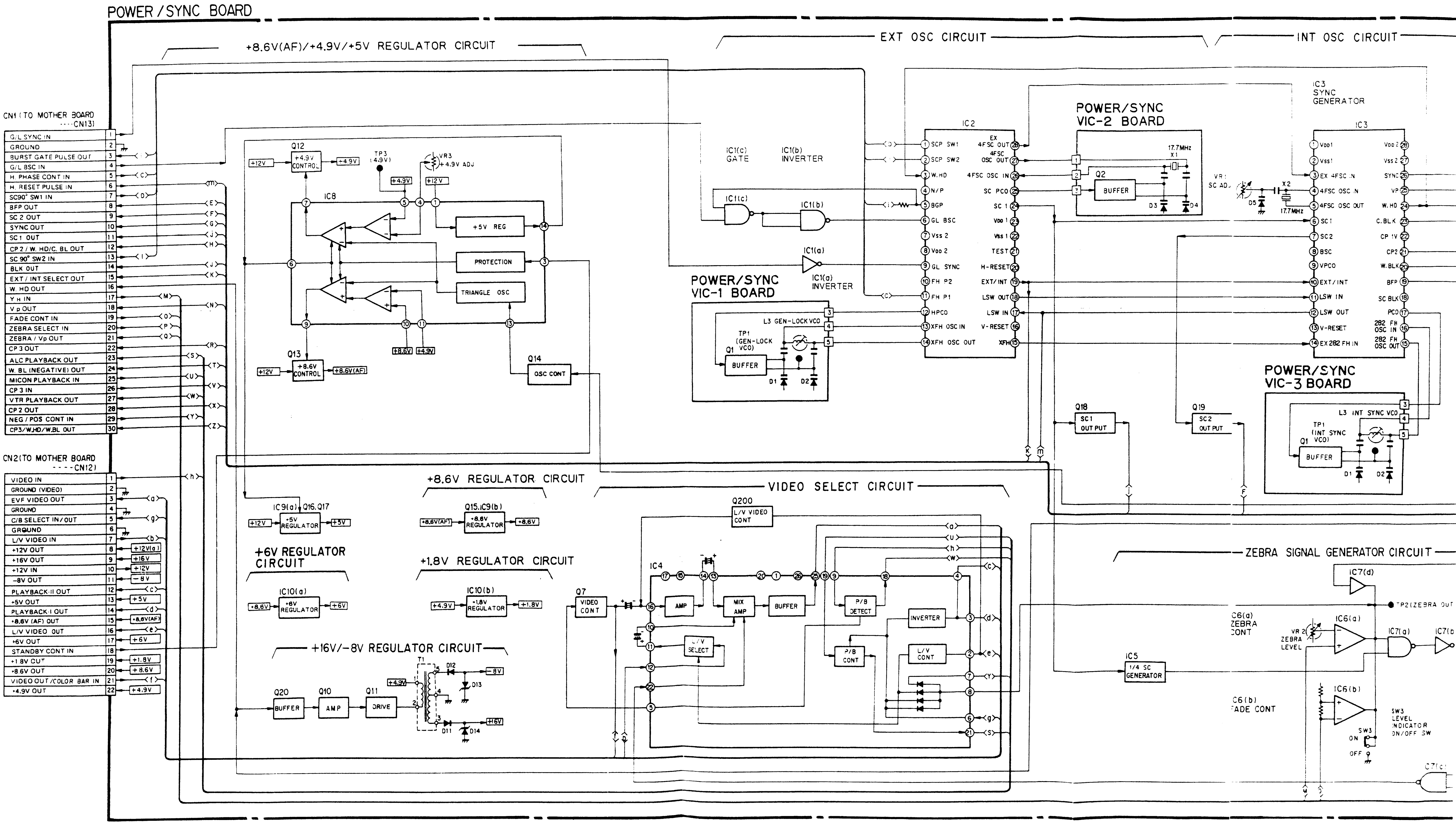
WIRING DIAGRAM .... 3-75 ~ 3-77
- SYSTEM CAMERA WVP-F10 with SYSTEM CAMERA KIT WV-KT100 .... 3-66, 3-67
- AUTOFOCUS LENS (WV-LZ14/8AF) 3-81
- 12X POWER ZOOM LENS (WV-LZ14/12) ....

Ⓓ 8, 10

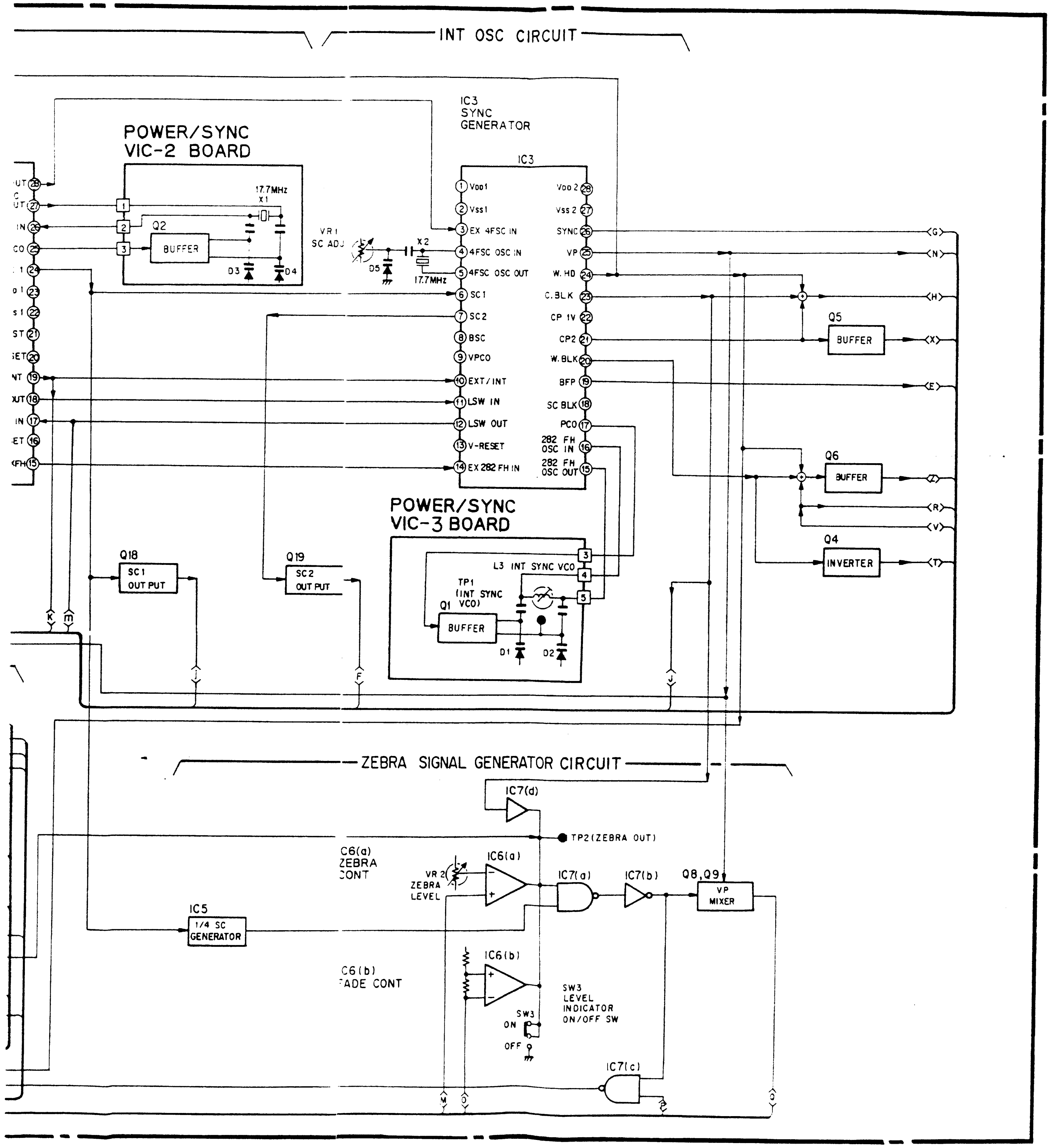
COMPOSITION

	WVP-F10 **(System Camera)**	**WV-KT100** **(System Camera Kit)**	**WV-KT200** **(System Camera Kit)**
WVP-F10 **(System Camera)**	○		
WV-LZ14/8AF (8X Auto Focus Lens)		○	
WV-VF01 (1" Electronic Viewfinder)		○	○
WV-GR12 (Grip Shoulder)		○	○
WV-MC12 (Stereo Microphone)		○	○
WV-Q43 (Cheek Pad)		○	
WV-CA10 (10 pin Camera Cable)		○	○
WV-Q44 (Camera Strap)		○	
WV-LZ14/12 (12X Power Zoom Lens)			○
WV-AD36 (Gen-lock Adaptor)			○

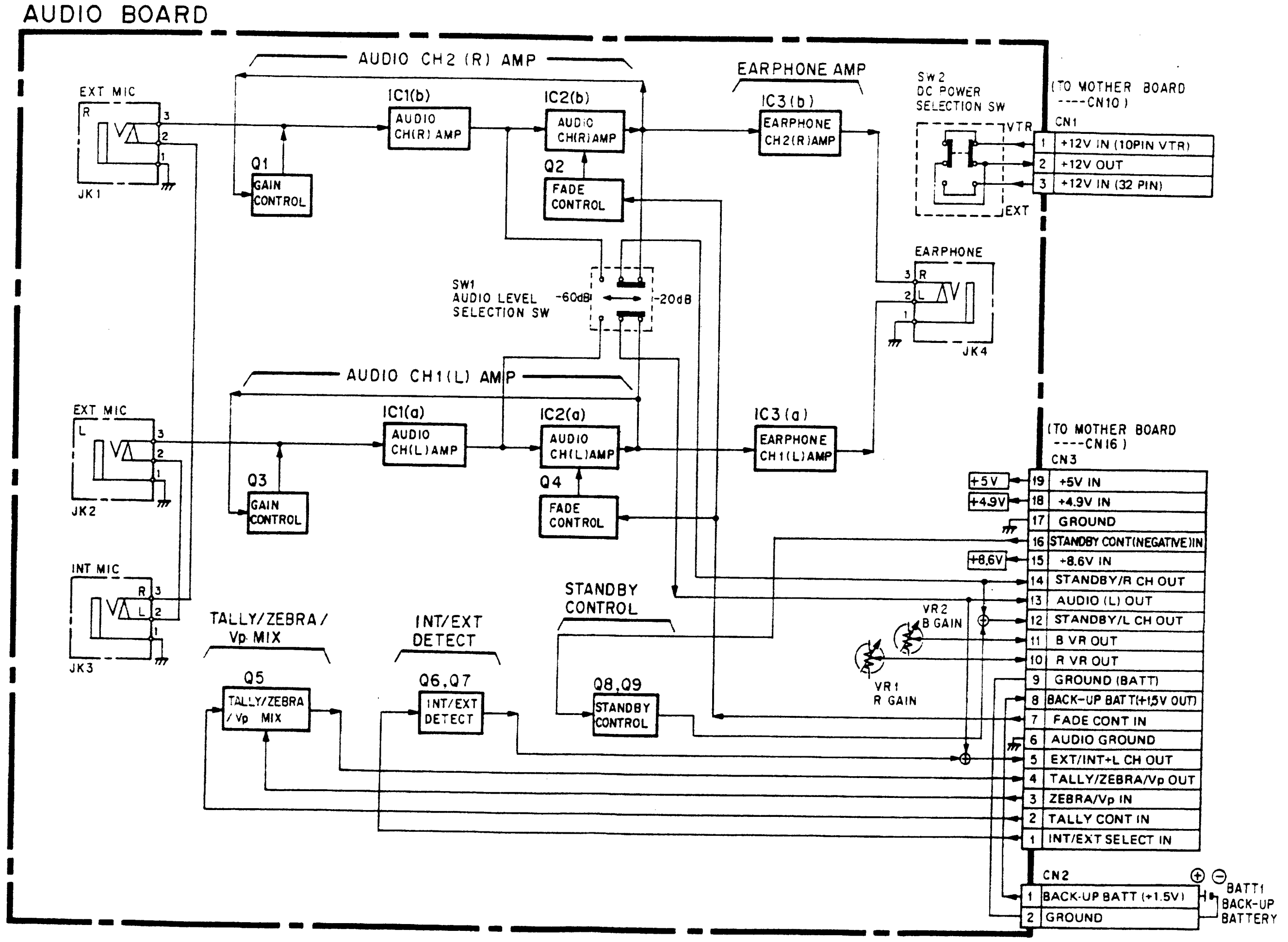
BLOCK DIAGRAM OF POWER/SYNC BOARD


POWER / SYNC BOARD
+8.6V(AF)/+4.9V/+5V REGULATOR CIRCUIT
EXT OSC CIRCUIT
INT OSC CIRCUIT
CN1 (TO MOTHER BOARD ----CN13)
1 G/L SYNC IN
2 GROUND
3 BURST GATE PULSE OUT
4 G/L BSC IN
5 H. PHASE CONT IN
6 H. RESET PULSE IN
7 SC90° SW1 IN
8 BFP OUT
9 SC 2 OUT
10 SYNC OUT
11 SC 1 OUT
12 CP 2 / W. HD/C. BL OUT
13 SC 90° SW2 IN
14 BLK OUT
15 EXT / INT SELECT OUT
16 W. HD OUT
17 Y H IN
18 V p OUT
19 FADE CONT IN
20 ZEBRA SELECT IN
21 ZEBRA / Vp OUT
22 CP 3 OUT
23 ALC PLAYBACK OUT
24 W. BL (NEGATIVE) OUT
25 MICON PLAYBACK IN
26 CP 3 IN
27 VTR PLAYBACK OUT
28 CP 2 OUT
29 NEG / POS CONT IN
30 CP3/W.HD/W.BL OUT
CN2 (TO MOTHER BOARD ----CN12)
1 VIDEO IN
2 GROUND (VIDEO)
3 EVF VIDEO OUT
4 GROUND
5 C/B SELECT IN/OUT
6 GROUND
7 L/V VIDEO IN
8 +12V OUT
9 +16V OUT
10 +12V IN
11 −8V OUT
12 PLAYBACK-II OUT
13 +5V OUT
14 PLAYBACK-I OUT
15 +8.6V (AF) OUT
16 L/V VIDEO OUT
17 +6V OUT
18 STANDBY CONT IN
19 +1.8V OUT
20 +8.6V OUT
21 VIDEO OUT / COLOR BAR IN
22 +4.9V OUT
+12V(a)
+16V
+12V
−8V
+5V
+8.6V(AF)
+6V
+1.8V
+8.6V
+4.9V
Q12
+12V
+4.9V CONTROL
+4.9V
TP3 (4.9V)
VR3 +4.9V ADJ
+4.9V
+12V
IC8
+5V REG
PROTECTION
TRIANGLE OSC
Q13
+12V
+8.6V CONTROL
+8.6V(AF)
+8.6V
+4.9V
Q14
OSC CONT
IC1(c) GATE
IC1(b) INVERTER
IC1(c)
IC1(b)
IC1(a)
IC1(a) INVERTER
POWER/SYNC VIC-1 BOARD
L3 GEN-LOCK VCO
TP1 (GEN-LOCK VCO)
Q1
BUFFER
D1
D2
IC2
1 SCP SW1
2 SCP SW2
3 W.HD
4 N/P
5 BGP
6 GL BSC
7 Vss 2
8 VDD 2
9 GL SYNC
10 FH P2
11 FH P1
12 HPCO
13 XFH OSC IN
14 XFH OSC OUT
28 EX 4FSC OUT
27 4FSC OSC OUT
26 4FSC OSC IN
25 SC PCO
24 SC 1
23 VDD 1
22 Vss 1
21 TEST
20 H-RESET
19 EXT/INT
18 LSW OUT
17 LSW IN
16 V-RESET
15 XFH
POWER/SYNC VIC-2 BOARD
17.7MHz X1
Q2
BUFFER
D3
D4
VR1 SC ADJ
D5
X2
17.7MHz
IC3 SYNC GENERATOR
IC3
1 VDD1
2 Vss1
3 EX 4FSC IN
4 4FSC OSC IN
5 4FSC OSC OUT
6 SC1
7 SC2
8 BSC
9 VPCO
10 EXT/INT
11 LSW IN
12 LSW OUT
13 V-RESET
14 EX 282 FH IN
28 VDD 2
27 Vss 2
26 SYNC
25 VP
24 W. HD
23 C.BLK
22 CP 1V
21 CP2
20 W.BLK
19 BFP
18 SC BLK
17 PCO
16 282 FH OSC IN
15 282 FH OSC OUT
POWER/SYNC VIC-3 BOARD
L3 INT SYNC VCO
TP1 (INT SYNC VCO)
Q1
BUFFER
D1
D2
Q18
SC1 OUT PUT
Q19
SC2 OUT PUT
+8.6V REGULATOR CIRCUIT
IC9(a) Q16, Q17
+12V
+5V REGULATOR
+5V
Q15, IC9(b)
+8.6V(AF)
+8.6V REGULATOR
+8.6V
+6V REGULATOR CIRCUIT
IC10(a)
+8.6V
+6V REGULATOR
+6V
+1.8V REGULATOR CIRCUIT
IC10(b)
+4.9V
+1.8V REGULATOR
+1.8V
+16V/−8V REGULATOR CIRCUIT
Q20
BUFFER
Q10
AMP
Q11
DRIVE
T1
+4.9V
D12
−8V
D13
D11
D14
+16V
VIDEO SELECT CIRCUIT
Q200
L/V VIDEO CONT
Q7
VIDEO CONT
IC4
AMP
MIX AMP
BUFFER
L/V SELECT
P/B DETECT
P/B CONT
INVERTER
L/V CONT
ZEBRA SIGNAL GENERATOR CIRCUIT
IC7(d)
TP2 (ZEBRA OUT
IC6(a) ZEBRA CONT
VR2 ZEBRA LEVEL
IC6(a)
IC7(a)
IC7(b
IC5
1/4 SC GENERATOR
IC6(b) FADE CONT
IC6(b)
SW3 LEVEL INDICATOR ON/OFF SW
SW3
ON
OFF
IC7(c)

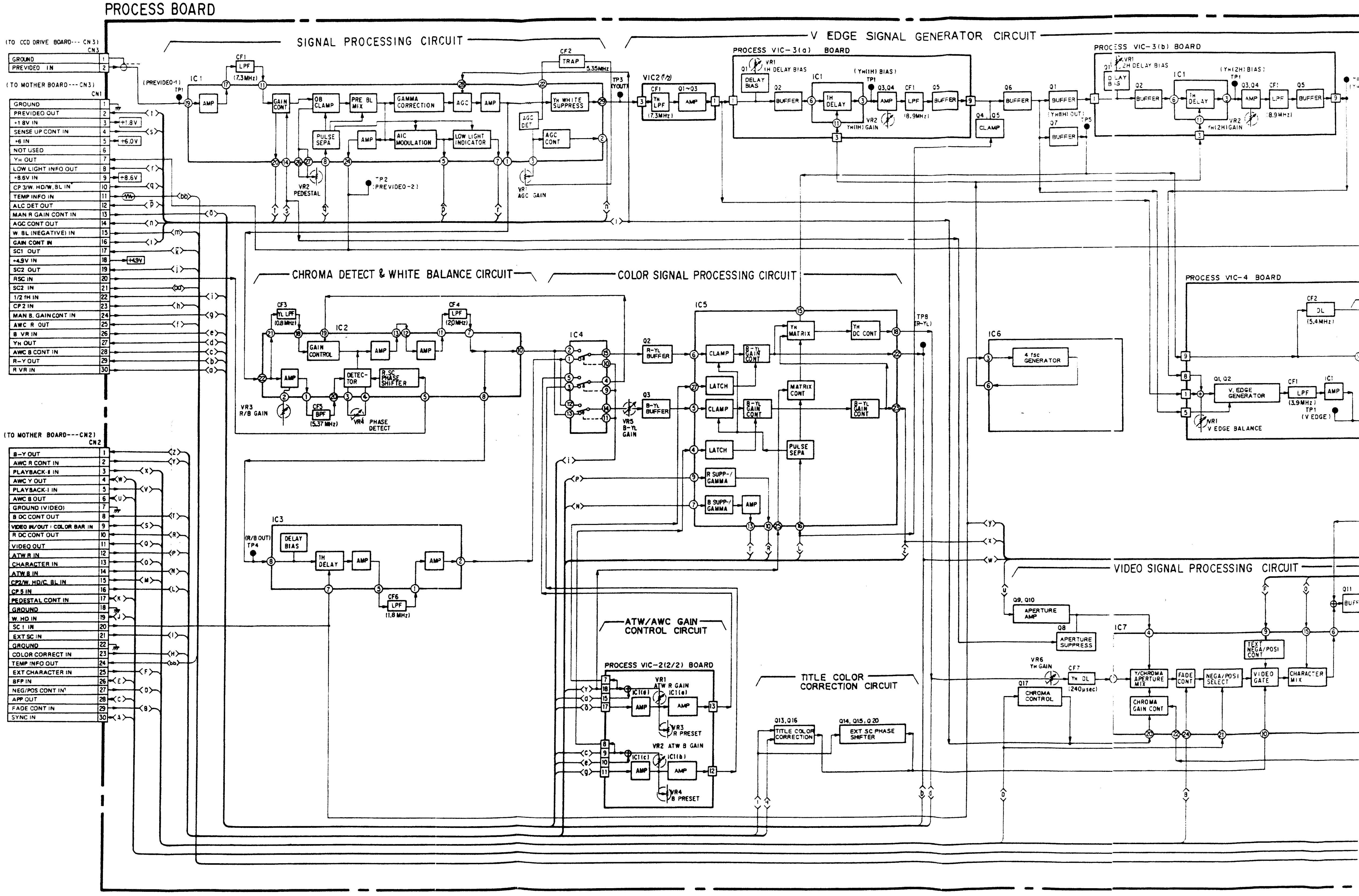
SYNC BOARD


INT OSC CIRCUIT
IC3
SYNC
GENERATOR
POWER/SYNC
VIC-2 BOARD
17.7MHz
X1
Q2
BUFFER
D3
D4
VR1
SC ADJ
D5
X2
17.7MHz
IC3
VDD1
VSS1
EX 4FSC IN
4FSC OSC IN
4FSC OSC OUT
SC1
SC2
BSC
VPCO
EXT/INT
LSW IN
LSW OUT
V-RESET
EX 282 FH IN
VDD2
VSS2
SYNC
VP
W.HD
C.BLK
CP 1V
CP2
W.BLK
BFP
SC BLK
PCO
282 FH OSC IN
282 FH OSC OUT
Q5
BUFFER
Q6
BUFFER
Q4
INVERTER
POWER/SYNC
VIC-3 BOARD
L3 INT SYNC VCO
TP1
(INT SYNC VCO)
Q1
BUFFER
D1
D2
Q18
SC1
OUT PUT
Q19
SC2
OUT PUT
ZEBRA SIGNAL GENERATOR CIRCUIT
IC7(d)
TP2(ZEBRA OUT)
C6(a)
ZEBRA
CONT
VR2
ZEBRA
LEVEL
IC6(a)
IC7(a)
IC7(b)
Q8,Q9
VP
MIXER
IC5
1/4 SC
GENERATOR
C6(b)
FADE CONT
IC6(b)
SW3
LEVEL
INDICATOR
ON/OFF SW
SW3
ON
OFF
IC7(c)

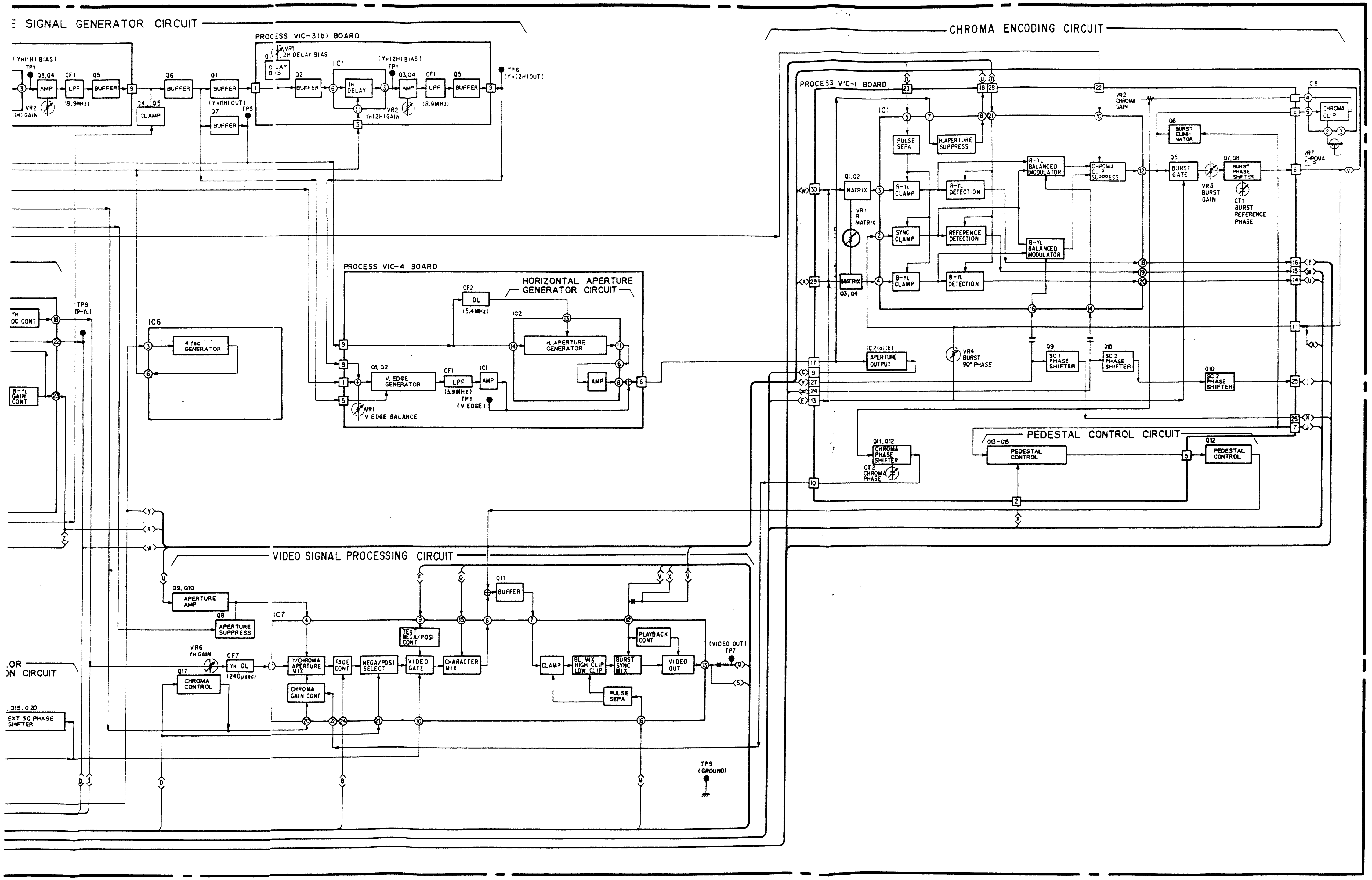
BLOCK DIAGRAM OF AUDIO BOARD


AUDIO BOARD
AUDIO CH2 (R) AMP
EXT MIC
R
JK1
IC1(b)
AUDIO
CH(R) AMP
Q1
GAIN
CONTROL
IC2(b)
AUDIO
CH(R)AMP
Q2
FADE
CONTROL
EARPHONE AMP
IC3(b)
EARPHONE
CH2(R)AMP
SW2
DC POWER
SELECTION SW
VTR
EXT
(TO MOTHER BOARD
----CN10)
CN1
1 +12V IN (10PIN VTR)
2 +12V OUT
3 +12V IN (32 PIN)
EARPHONE
JK4
SW1
AUDIO LEVEL
SELECTION SW
-60dB
-20dB
AUDIO CH1(L) AMP
EXT MIC
L
JK2
IC1(a)
AUDIO
CH(L)AMP
Q3
GAIN
CONTROL
IC2(a)
AUDIO
CH(L)AMP
Q4
FADE
CONTROL
IC3(a)
EARPHONE
CH1(L)AMP
INT MIC
JK3
TALLY/ZEBRA/
Vp MIX
Q5
TALLY/ZEBRA
/Vp MIX
INT/EXT
DETECT
Q6,Q7
INT/EXT
DETECT
STANDBY
CONTROL
Q8,Q9
STANDBY
CONTROL
VR2
B GAIN
VR1
R GAIN
(TO MOTHER BOARD
----CN16)
CN3
+5V
+4.9V
+8.6V
19 +5V IN
18 +4.9V IN
17 GROUND
16 STANDBY CONT(NEGATIVE)IN
15 +8.6V IN
14 STANDBY/R CH OUT
13 AUDIO (L) OUT
12 STANDBY/L CH OUT
11 B VR OUT
10 R VR OUT
9 GROUND (BATT)
8 BACK-UP BATT(+1.5V OUT)
7 FADE CONT IN
6 AUDIO GROUND
5 EXT/INT+L CH OUT
4 TALLY/ZEBRA/Vp OUT
3 ZEBRA/Vp IN
2 TALLY CONT IN
1 INT/EXT SELECT IN
CN2
1 BACK-UP BATT (+1.5V)
2 GROUND
BATT1
BACK-UP
BATTERY

BLOCK DIAGRAM OF PROCESS BOARD

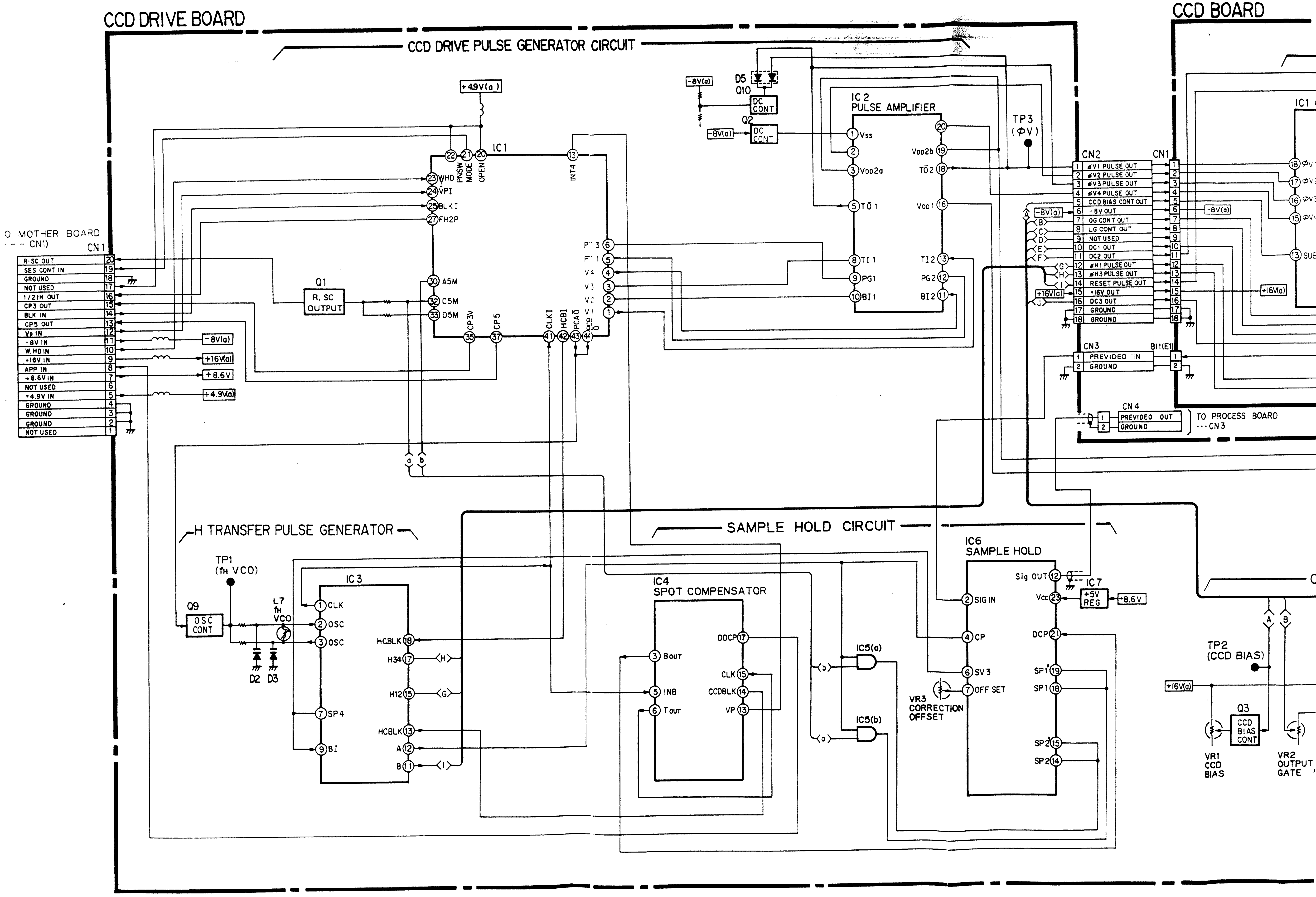

PROCESS BOARD
(TO CCD DRIVE BOARD--- CN3)
CN3
GROUND 1
PREVIDEO IN 2
(TO MOTHER BOARD---CN3)
CN1
GROUND 1
PREVIDEO OUT 2
+1.8V IN 3
SENSE UP CONT IN 4
+6 IN 5
NOT USED 6
YH OUT 7
LOW LIGHT INFO OUT 8
+8.6V IN 9
CP 3/W. HD/W. BL IN 10
TEMP INFO IN 11
ALC DET OUT 12
MAN R GAIN CONT IN 13
AGC CONT OUT 14
W. BL (NEGATIVE) IN 15
GAIN CONT IN 16
SC1 OUT 17
+4.9V IN 18
SC2 OUT 19
RSC IN 20
SC2 IN 21
1/2 fH IN 22
CP 2 IN 23
MAN B. GAIN CONT IN 24
AWC R OUT 25
B VR IN 26
YH OUT 27
AWC B CONT IN 28
R-Y OUT 29
R VR IN 30
+1.8V
+6.0V
+8.6V
+4.9V
(TO MOTHER BOARD---CN2)
CN2
B-Y OUT 1
AWC R CONT IN 2
PLAYBACK-II IN 3
AWC Y OUT 4
PLAYBACK-I IN 5
AWC B OUT 6
GROUND (VIDEO) 7
B DC CONT OUT 8
VIDEO IN/OUT : COLOR BAR IN 9
R DC CONT OUT 10
VIDEO OUT 11
ATW R IN 12
CHARACTER IN 13
ATW B IN 14
CP2/W. HD/C. BL IN 15
CP 5 IN 16
PEDESTAL CONT IN 17
GROUND 18
W. HD IN 19
SC 1 IN 20
EXT SC IN 21
GROUND 22
COLOR CORRECT IN 23
TEMP INFO OUT 24
EXT CHARACTER IN 25
BFP IN 26
NEG/POS CONT IN 27
APP OUT 28
FADE CONT IN 29
SYNC IN 30
SIGNAL PROCESSING CIRCUIT
(PREVIDEO-1)
TP1
IC1
AMP
CF1
LPF
(7.3MHz)
GAIN CONT
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
CF2
TRAP
5.35MHz
YH WHITE SUPPRESS
AGC DET
AGC CONT
PULSE SEPA
AMP
AIC MODULATION
LOW LIGHT INDICATOR
VR2
PEDESTAL
TP2
(PREVIDEO-2)
VR1
AGC GAIN
TP3
(YOUT)
V EDGE SIGNAL GENERATOR CIRCUIT
VIC2 (1/2)
CF1
YH LPF
(7.3MHz)
Q1~Q3
AMP
PROCESS VIC-3(a) BOARD
Q1
VR1
1H DELAY BIAS
DELAY BIAS
Q2
BUFFER
IC1
1H DELAY
(YH(1H) BIAS)
TP1
Q3,Q4
AMP
CF1
LPF
(8.9MHz)
Q5
BUFFER
VR2
YH(1H) GAIN
Q4, Q5
CLAMP
Q6
BUFFER
Q1
BUFFER
(YH(1H) OUT)
Q7
BUFFER
TP5
PROCESS VIC-3(b) BOARD
Q1
VR1
2H DELAY BIAS
DELAY BIAS
Q2
BUFFER
IC1
1H DELAY
(YH(2H) BIAS)
TP1
Q3,Q4
AMP
CF1
LPF
(8.9MHz)
Q5
BUFFER
VR2
YH(2H) GAIN
CHROMA DETECT & WHITE BALANCE CIRCUIT
CF3
YL LPF
(0.8MHz)
IC2
GAIN CONTROL
AMP
AMP
CF4
LPF
(2.0MHz)
AMP
DETEC-TOR
R.SC PHASE SHIFTER
VR3
R/B GAIN
CF5
BPF
(5.37MHz)
VR4
PHASE DETECT
COLOR SIGNAL PROCESSING CIRCUIT
IC4
Q2
R-YL BUFFER
Q3
B-YL BUFFER
VR5
B-YL GAIN
IC5
CLAMP
B-YL GAIN CONT
LATCH
CLAMP
B-YL GAIN CONT
LATCH
R SUPP-/GAMMA
B SUPP-/GAMMA
AMP
YH MATRIX
YH DC CONT
MATRIX CONT
B-YL GAIN CONT
PULSE SEPA
TP8
(R-YL)
IC6
4 fsc GENERATOR
PROCESS VIC-4 BOARD
CF2
DL
(5.4MHz)
Q1, Q2
V. EDGE GENERATOR
CF1
LPF
(3.9MHz)
IC1
AMP
TP1
(V EDGE)
VR1
V EDGE BALANCE
IC3
(R/B OUT)
TP4
DELAY BIAS
1H DELAY
AMP
AMP
CF6
LPF
(1.8MHz)
ATW/AWC GAIN CONTROL CIRCUIT
PROCESS VIC-2(2/2) BOARD
VR1
ATW R GAIN
IC1(d)
IC1(a)
AMP
AMP
VR3
R PRESET
VR2 ATW B GAIN
IC1(c)
IC1(b)
AMP
AMP
VR4
B PRESET
TITLE COLOR CORRECTION CIRCUIT
Q13, Q16
TITLE COLOR CORRECTION
Q14, Q15, Q20
EXT SC PHASE SHIFTER
VIDEO SIGNAL PROCESSING CIRCUIT
Q9, Q10
APERTURE AMP
Q8
APERTURE SUPPRESS
VR6
YH GAIN
CF7
YH DL
(240μsec)
Q17
CHROMA CONTROL
IC7
Y/CHROMA APERTURE MIX
CHROMA GAIN CONT
FADE CONT
NEGA/POSI SELECT
TEXT NEGA/POSI CONT
VIDEO GATE
CHARACTER MIX
Q11
BUFF

BLOCK DIAGRAM OF PROCESS BOARD

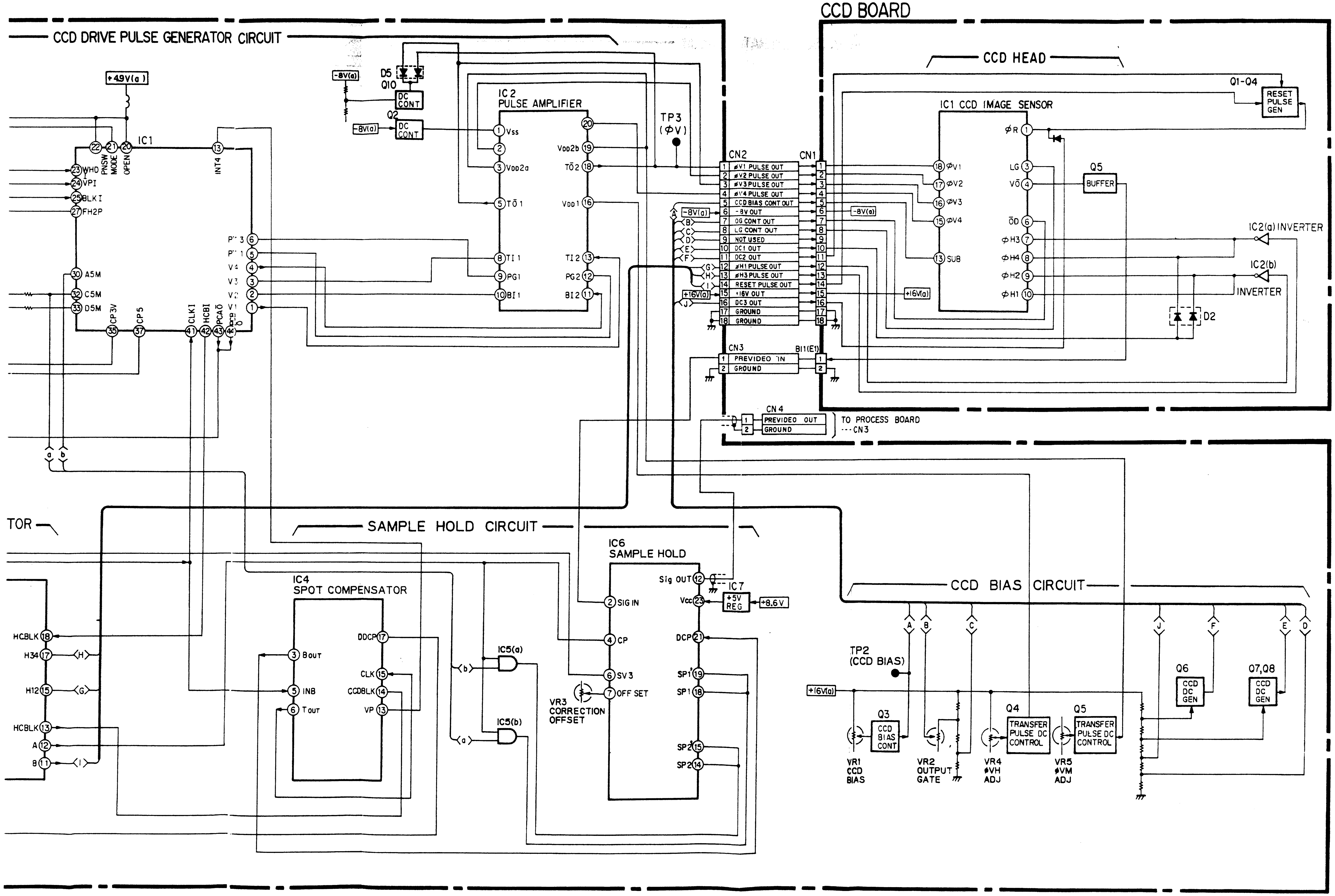


SIGNAL GENERATOR CIRCUIT
PROCESS VIC-3(b) BOARD
(YH(1H) BIAS)
TP1
Q3,Q4
AMP
CF1
LPF
(8.9MHz)
Q5
BUFFER
VR2
(1H) GAIN
Q4, Q5
CLAMP
Q6
BUFFER
Q1
BUFFER
(YH(1H) OUT)
Q7
BUFFER
TP5
VR1
2H DELAY BIAS
DELAY BIAS
Q2
BUFFER
IC1
1H DELAY
(YH(2H) BIAS)
YH(2H) GAIN
TP6
(YH(2H) OUT)
CHROMA ENCODING CIRCUIT
PROCESS VIC-1 BOARD
IC1
PULSE SEPA
H.APERTURE SUPPRESS
Q1, Q2
MATRIX
VR1
R MATRIX
Q3, Q4
R-YL CLAMP
R-YL DETECTION
SYNC CLAMP
REFERENCE DETECTION
B-YL CLAMP
B-YL DETECTION
R-YL BALANCED MODULATOR
B-YL BALANCED MODULATOR
CHROMA CLIP SUPPRESS
VR2
CHROMA GAIN
Q6
BURST ELIMINATOR
Q5
BURST GATE
VR3
BURST GAIN
Q7, Q8
BURST PHASE SHIFTER
CT1
BURST REFERENCE PHASE
CHROMA CLIP
VR7
CHROMA CLIP
IC2(a)(b)
APERTURE OUTPUT
VR4
BURST 90° PHASE
Q9
SC 1 PHASE SHIFTER
Q10
SC 2 PHASE SHIFTER
Q10
SC 2 PHASE SHIFTER
Q11, Q12
CHROMA PHASE SHIFTER
CT2
CHROMA PHASE
PEDESTAL CONTROL CIRCUIT
Q13-Q16
PEDESTAL CONTROL
Q12
PEDESTAL CONTROL
PROCESS VIC-4 BOARD
HORIZONTAL APERTURE GENERATOR CIRCUIT
CF2
DL
(5.4MHz)
IC2
H. APERTURE GENERATOR
AMP
Q1, Q2
V. EDGE GENERATOR
CF1
LPF
(3.9MHz)
IC1
AMP
TP1
(V EDGE)
VR1
V EDGE BALANCE
IC6
4 fsc GENERATOR
YH DC CONT
TP8
(R-YL)
B-YL GAIN CONT
VIDEO SIGNAL PROCESSING CIRCUIT
Q9, Q10
APERTURE AMP
Q8
APERTURE SUPPRESS
IC7
VR6
YH GAIN
CF7
YH DL
(240μsec)
Q17
CHROMA CONTROL
Y/CHROMA APERTURE MIX
CHROMA GAIN CONT
FADE CONT
NEGA/POSI SELECT
TEXT NEGA/POSI CONT
VIDEO GATE
CHARACTER MIX
Q11
BUFFER
CLAMP
BL MIX HIGH CLIP LOW CLIP
BURST SYNC MIX
PLAYBACK CONT
PULSE SEPA
VIDEO OUT
(VIDEO OUT)
TP7
TP9
(GROUND)
OR CIRCUIT
ON CIRCUIT
Q15, Q20
EXT SC PHASE SHIFTER

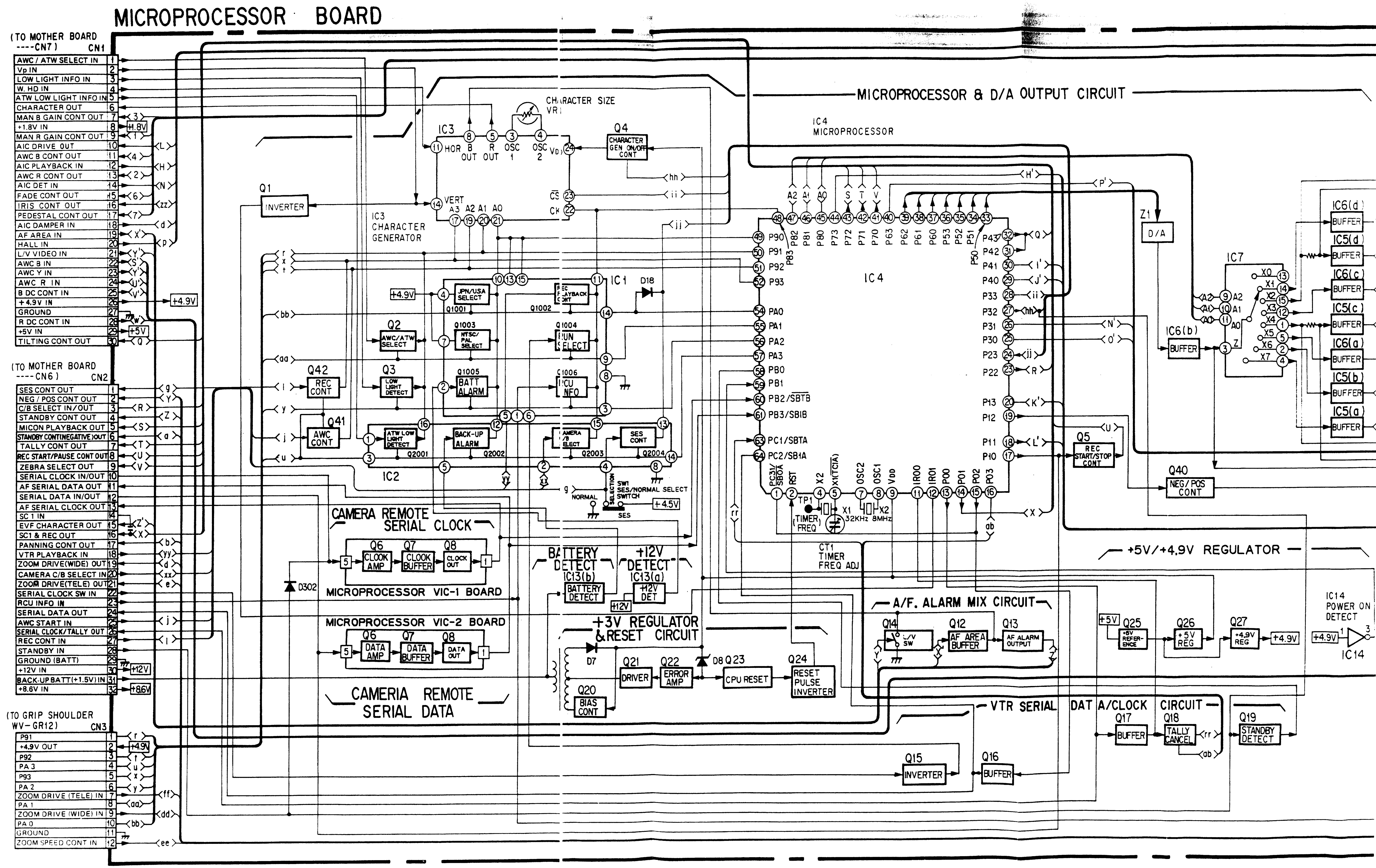
BLOCK DIAGRAM OF CCD AND CCD DRIVE BOARD


CCD DRIVE BOARD
CCD DRIVE PULSE GENERATOR CIRCUIT
+4.9V(a)
IC1
WHD
VPI
BLKI
FH2P
PNSW MODE
OPEN
INT4
A5M
C5M
D5M
CP3V
CP5
CLKI
HCBI
PCAŌ
Q1
R. SC OUTPUT
O MOTHER BOARD
- - - CN1)
CN1
R·SC OUT
SES CONT IN
GROUND
NOT USED
1/2fH OUT
CP3 OUT
BLK IN
CP5 OUT
Vp IN
-8V IN
W.HD IN
+16V IN
APP IN
+8.6V IN
NOT USED
+4.9V IN
GROUND
GROUND
GROUND
NOT USED
-8V(a)
+16V(a)
+8.6V
+4.9V(a)
D5
Q10
DC CONT
Q2
DC CONT
-8V(a)
IC2
PULSE AMPLIFIER
Vss
VDD2a
TŌ1
TI1
PG1
BI1
VDD2b
TŌ2
VDD1
TI2
PG2
BI2
TP3
(φV)
CN2
φV1 PULSE OUT
φV2 PULSE OUT
φV3 PULSE OUT
φV4 PULSE OUT
CCD BIAS CONT OUT
-8V OUT
OG CONT OUT
LG CONT OUT
NOT USED
DC1 OUT
DC2 OUT
φH1 PULSE OUT
φH3 PULSE OUT
RESET PULSE OUT
+16V OUT
DC3 OUT
GROUND
GROUND
CN3
PREVIDEO IN
GROUND
BI1(E1)
CN4
PREVIDEO OUT
GROUND
TO PROCESS BOARD
---CN3
CCD BOARD
IC1
φV1
φV2
φV3
φV4
SUB
H TRANSFER PULSE GENERATOR
TP1
(fH VCO)
Q9
OSC CONT
L7
fH VCO
D2
D3
IC3
CLK
OSC
OSC
SP4
BI
HCBLK
H34
H12
HCBLK
A
B
SAMPLE HOLD CIRCUIT
IC4
SPOT COMPENSATOR
Bout
INB
Tout
DDCP
CLK
CCDBLK
VP
IC5(a)
IC5(b)
VR3
CORRECTION
OFFSET
IC6
SAMPLE HOLD
SIG IN
CP
SV3
OFF SET
Sig OUT
Vcc
DCP
SP1'
SP1
SP2'
SP2
IC7
+5V REG
+8.6V
TP2
(CCD BIAS)
+16V(a)
Q3
CCD BIAS CONT
VR1
CCD BIAS
VR2
OUTPUT GATE

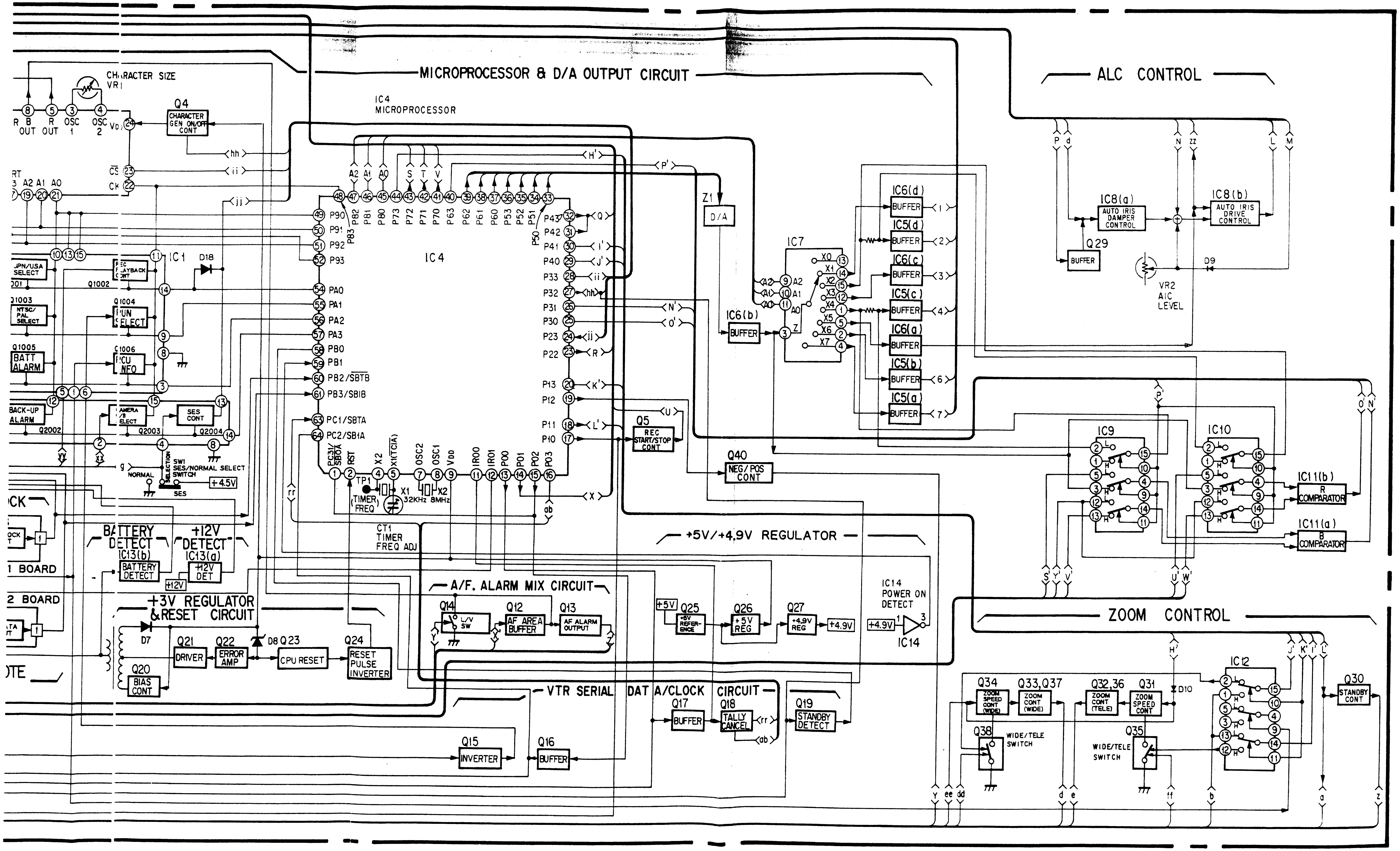
BLOCK DIAGRAM OF CCD AND CCD DRIVE BOARD


CCD BOARD
CCD DRIVE PULSE GENERATOR CIRCUIT
+4.9V(a)
IC1
WHD
VPI
BLK I
FH2P
PNSW MODE
OPEN
INT4
A5M
C5M
D5M
CP3V
CP5
CLK1
HCBI
PCAŌ
CP9
-8V(a)
D5
Q10
DC CONT
Q2
IC2
PULSE AMPLIFIER
Vss
VDD2a
TŌ1
TI1
PG1
BI1
VDD2b
TŌ2
VDD1
TI2
PG2
BI2
TP3
(ϕV)
CN2
CN1
ϕV1 PULSE OUT
ϕV2 PULSE OUT
ϕV3 PULSE OUT
ϕV4 PULSE OUT
CCD BIAS CONT OUT
-8V OUT
OG CONT OUT
LG CONT OUT
NOT USED
DC1 OUT
DC2 OUT
ϕH1 PULSE OUT
ϕH3 PULSE OUT
RESET PULSE OUT
+16V OUT
DC3 OUT
GROUND
GROUND
+16V(a)
CN3
PREVIDEO IN
GROUND
BI1(E1)
CN4
PREVIDEO OUT
GROUND
TO PROCESS BOARD
---CN3
CCD HEAD
Q1-Q4
RESET PULSE GEN
IC1 CCD IMAGE SENSOR
ϕR
ϕV1
ϕV2
ϕV3
ϕV4
SUB
LG
VŌ
ŌD
ϕH3
ϕH4
ϕH2
ϕH1
Q5
BUFFER
IC2(a) INVERTER
IC2(b)
INVERTER
D2
TOR
SAMPLE HOLD CIRCUIT
HCBLK
H34
H12
HCBLK
A
B
IC4
SPOT COMPENSATOR
BOUT
INB
TOUT
DDCP
CLK
CCDBLK
VP
IC5(a)
IC5(b)
IC6
SAMPLE HOLD
SIG IN
CP
SV3
OFF SET
Sig OUT
Vcc
DCP
SP1
SP1
SP2
SP2
IC7
+5V REG
+8.6V
VR3
CORRECTION OFFSET
CCD BIAS CIRCUIT
TP2
(CCD BIAS)
+16V(a)
Q3
CCD BIAS CONT
Q4
TRANSFER PULSE DC CONTROL
Q5
TRANSFER PULSE DC CONTROL
Q6
CCD DC GEN
Q7,Q8
CCD DC GEN
VR1
CCD BIAS
VR2
OUTPUT GATE
VR4
ϕVH ADJ
VR5
ϕVM ADJ

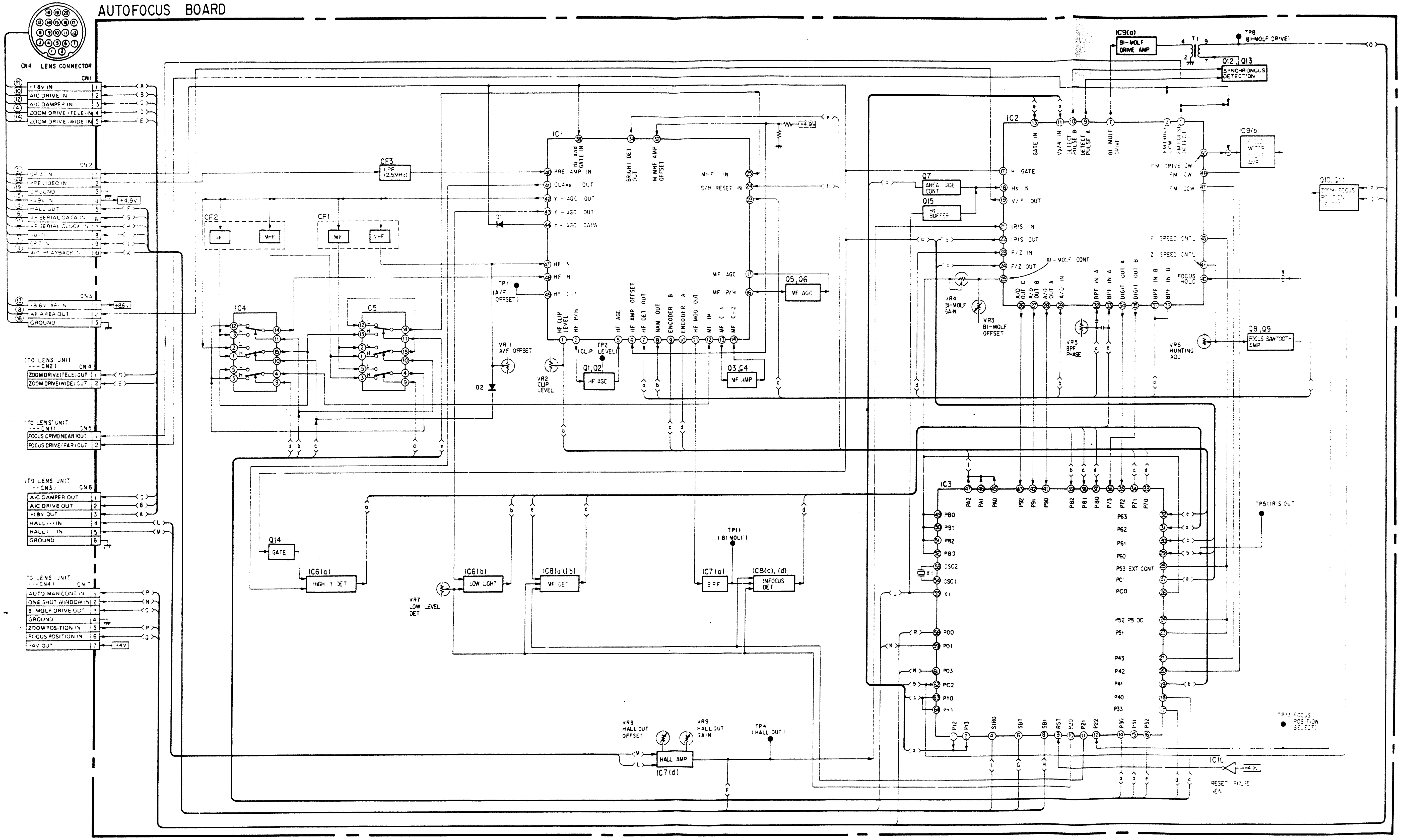
BLOCK DIAGRAM OF MICROPROCESSOR BOARD


MICROPROCESSOR BOARD
(TO MOTHER BOARD ----CN7) CN1
1 AWC / ATW SELECT IN
2 Vp IN
3 LOW LIGHT INFO IN
4 W. HD IN
5 ATW LOW LIGHT INFO IN
6 CHARACTER OUT
7 MAN B GAIN CONT OUT
8 +1.8V IN
9 MAN R GAIN CONT OUT
10 AIC DRIVE OUT
11 AWC B CONT OUT
12 AIC PLAYBACK IN
13 AWC R CONT OUT
14 AIC DET IN
15 FADE CONT OUT
16 IRIS CONT OUT
17 PEDESTAL CONT OUT
18 AIC DAMPER IN
19 AF AREA IN
20 HALL IN
21 L/V VIDEO IN
22 AWC B IN
23 AWC Y IN
24 AWC R IN
25 B DC CONT IN
26 +4.9V IN
27 GROUND
28 R DC CONT IN
29 +5V IN
30 TILTING CONT OUT
(TO MOTHER BOARD ----CN6) CN2
1 SES CONT OUT
2 NEG / POS CONT OUT
3 C/B SELECT IN/OUT
4 STANDBY CONT OUT
5 MICON PLAYBACK OUT
6 STANDBY CONT(NEGATIVE)OUT
7 TALLY CONT OUT
8 REC START/PAUSE CONT OUT
9 ZEBRA SELECT OUT
10 SERIAL CLOCK IN/OUT
11 AF SERIAL DATA OUT
12 SERIAL DATA IN/OUT
13 AF SERIAL CLOCK OUT
14 SC 1 IN
15 EVF CHARACTER OUT
16 SC1 & REC OUT
17 PANNING CONT OUT
18 VTR PLAYBACK IN
19 ZOOM DRIVE(WIDE) OUT
20 CAMERA C/B SELECT IN
21 ZOOM DRIVE(TELE) OUT
22 SERIAL CLOCK SW IN
23 RCU INFO IN
24 SERIAL DATA OUT
25 AWC START IN
26 SERIAL CLOCK/TALLY OUT
27 REC CONT IN
28 STANDBY IN
29 GROUND (BATT)
30 +12V IN
31 BACK-UP BATT(+1.5V) IN
32 +8.6V IN
(TO GRIP SHOULDER WV-GR12) CN3
1 P91
2 +4.9V OUT
3 P92
4 PA 3
5 P93
6 PA 2
7 ZOOM DRIVE (TELE) IN
8 PA 1
9 ZOOM DRIVE (WIDE) IN
10 PA 0
11 GROUND
12 ZOOM SPEED CONT IN
H.8V
+4.9V
+5V
+12V
+8.6V
+4.9V
CHARACTER SIZE VR1
IC3
HOR B OUT
R OUT
OSC 1
OSC 2
VDD
VERT
A3 A2 A1 A0
CS
CK
IC3 CHARACTER GENERATOR
Q1 INVERTER
Q4 CHARACTER GEN ON/OFF CONT
IC1
D18
+4.9V
JPN/USA SELECT Q1001
REC PLAYBACK CONT Q1002
Q2 AWC/ATW SELECT
NTSC/PAL SELECT Q1003
RUN SELECT Q1004
Q42 REC CONT
Q3 LOW LIGHT DETECT
BATT ALARM Q1005
MCU INFO Q1006
Q41 AWC CONT
ATW LOW LIGHT DETECT Q2001
BACK-UP ALARM Q2002
CAMERA C/B SELECT Q2003
SES CONT Q2004
IC2
SW1 SES/NORMAL SELECT SWITCH
SELECTION
NORMAL
SES
+4.5V
CAMERA REMOTE SERIAL CLOCK
Q6 CLOOK AMP
Q7 CLOOK BUFFER
Q8 CLOCK OUT
MICROPROCESSOR VIC-1 BOARD
D302
MICROPROCESSOR VIC-2 BOARD
Q6 DATA AMP
Q7 DATA BUFFER
Q8 DATA OUT
CAMERA REMOTE SERIAL DATA
BATTERY DETECT
IC13(b) BATTERY DETECT
+12V DETECT
IC13(a) +12V DET
+12V
+3V REGULATOR &RESET CIRCUIT
D7
Q20 BIAS CONT
Q21 DRIVER
Q22 ERROR AMP
D8 Q23 CPU RESET
Q24 RESET PULSE INVERTER
MICROPROCESSOR & D/A OUTPUT CIRCUIT
IC4 MICROPROCESSOR
IC4
A2 A1 A0 S T V
P90 P91 P92 P93
PA0 PA1 PA2 PA3 PB0 PB1 PB2/SBTB PB3/SBIB PC1/SBTA PC2/SB1A
P83 P82 P81 P80 P73 P72 P71 P70 P63 P62 P61 P60 P53 P52 P51 P50
P43 P42 P41 P40 P33 P32 P31 P30 P23 P22 P13 P12 P11 P10
PC31/SBOX RST X2 X1(TCIA) OSC2 OSC1 VDD IR00 IR01 P00 P01 P02 P03
TP1 (TIMER FREQ)
X1 32KHz
X2 8MHz
CT1 TIMER FREQ ADJ
Z1 D/A
IC6(b) BUFFER
IC7
X0 X1 X2 X3 X4 X5 X6 X7
A2 A1 A0 Z
IC6(d) BUFFER
IC5(d) BUFFER
IC6(c) BUFFER
IC5(c) BUFFER
IC6(a) BUFFER
IC5(b) BUFFER
IC5(a) BUFFER
Q5 REC START/STOP CONT
Q40 NEG/POS CONT
+5V/+4.9V REGULATOR
+5V
Q25 +8V REFERENCE
Q26 +5V REG
Q27 +4.9V REG
+4.9V
IC14 POWER ON DETECT
+4.9V
IC14
A/F. ALARM MIX CIRCUIT
Q14 L/V SW
Q12 AF AREA BUFFER
Q13 AF ALARM OUTPUT
VTR SERIAL DATA/CLOCK CIRCUIT
Q17 BUFFER
Q18 TALLY CANCEL
Q19 STANDBY DETECT
Q15 INVERTER
Q16 BUFFER

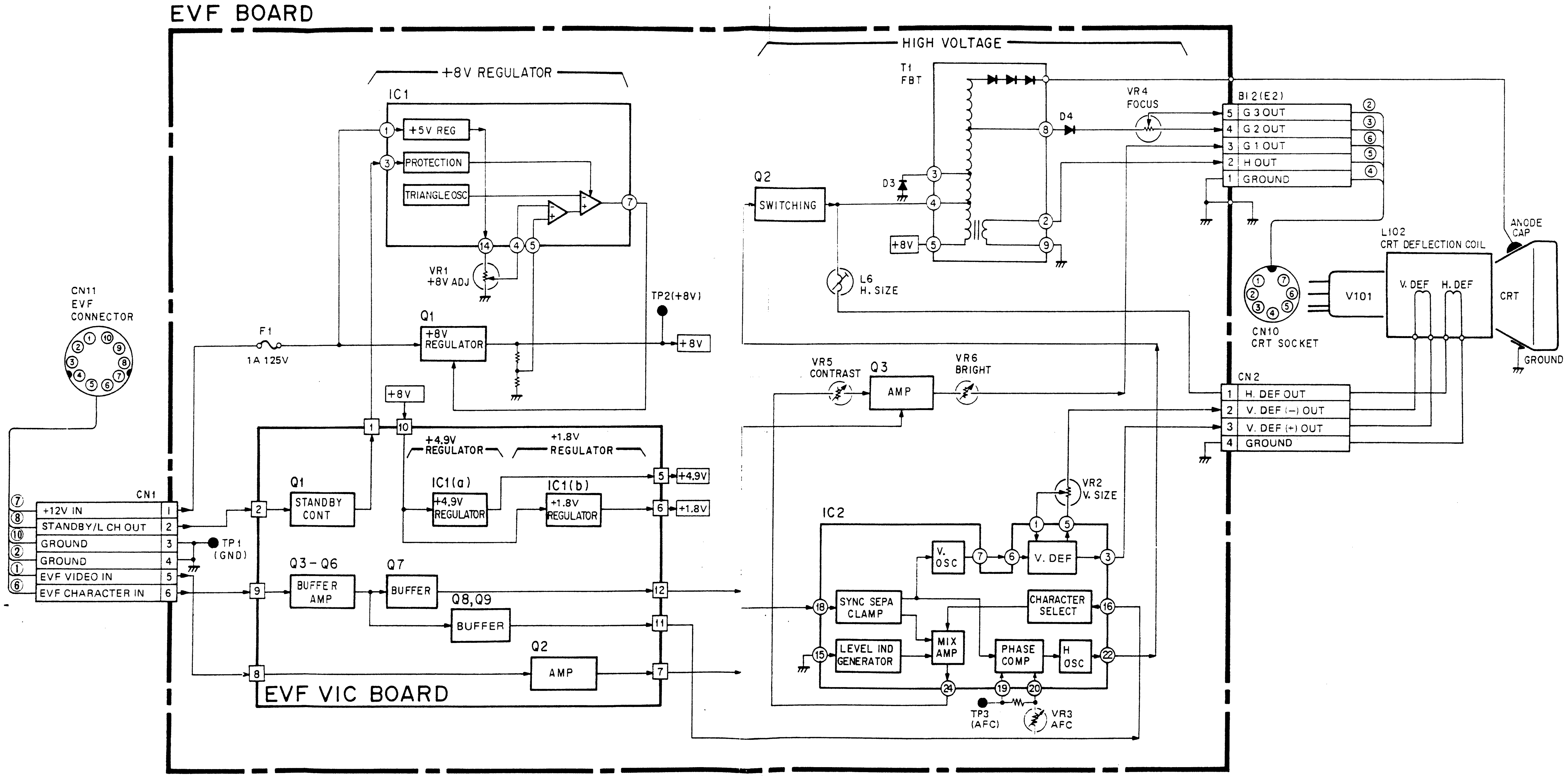
BLOCK DIAGRAM OF MICROPROCESSOR BOARD


MICROPROCESSOR & D/A OUTPUT CIRCUIT
ALC CONTROL
IC4 MICROPROCESSOR
CHARACTER SIZE VR1
Q4 CHARACTER GEN ON/OFF CONT
R OUT
B OUT
OSC 1
OSC 2
JPN/USA SELECT
NTSC/PAL SELECT
BATT ALARM
BACK-UP ALARM
REC PLAYBACK CONT
FUN SELECT
ECU INFO
CAMERA SELECT
SES CONT
SW1 SELECTION SES/NORMAL SELECT SWITCH
NORMAL
SES
+4.5V
IC1
D18
Q1002
Q1003
Q1004
Q1005
Q1006
Q2002
Q2003
Q2004
TP1 (TIMER FREQ)
X1 32KHz
X2 8MHz
CT1 TIMER FREQ ADJ
Z1 D/A
IC6(b) BUFFER
IC7
IC6(d) BUFFER
IC5(d) BUFFER
IC6(c) BUFFER
IC5(c) BUFFER
IC6(a) BUFFER
IC5(b) BUFFER
IC5(a) BUFFER
IC8(a) AUTO IRIS DAMPER CONTROL
IC8(b) AUTO IRIS DRIVE CONTROL
Q29 BUFFER
VR2 AIC LEVEL
D9
IC9
IC10
IC11(b) R COMPARATOR
IC11(a) B COMPARATOR
Q5 REC START/STOP CONT
Q40 NEG/POS CONT
BATTERY DETECT
IC13(b) BATTERY DETECT
+12V DETECT
IC13(a) +12V DET
+12V
1 BOARD
2 BOARD
+3V REGULATOR & RESET CIRCUIT
D7
Q20 BIAS CONT
Q21 DRIVER
Q22 ERROR AMP
D8 Q23 CPU RESET
Q24 RESET PULSE INVERTER
A/F. ALARM MIX CIRCUIT
Q14 L/V SW
Q12 AF AREA BUFFER
Q13 AF ALARM OUTPUT
+5V/+4.9V REGULATOR
+5V
Q25 +5V REFERENCE
Q26 +5V REG
Q27 +4.9V REG
+4.9V
IC14 POWER ON DETECT
VTR SERIAL DATA/CLOCK CIRCUIT
Q17 BUFFER
Q18 TALLY CANCEL
Q19 STANDBY DETECT
Q15 INVERTER
Q16 BUFFER
ZOOM CONTROL
Q34 ZOOM SPEED CONT (WIDE)
Q33,Q37 ZOOM CONT (WIDE)
Q32,36 ZOOM CONT (TELE)
Q31 ZOOM SPEED CONT
D10
Q38 WIDE/TELE SWITCH
Q35 WIDE/TELE SWITCH
IC12
Q30 STANDBY CONT

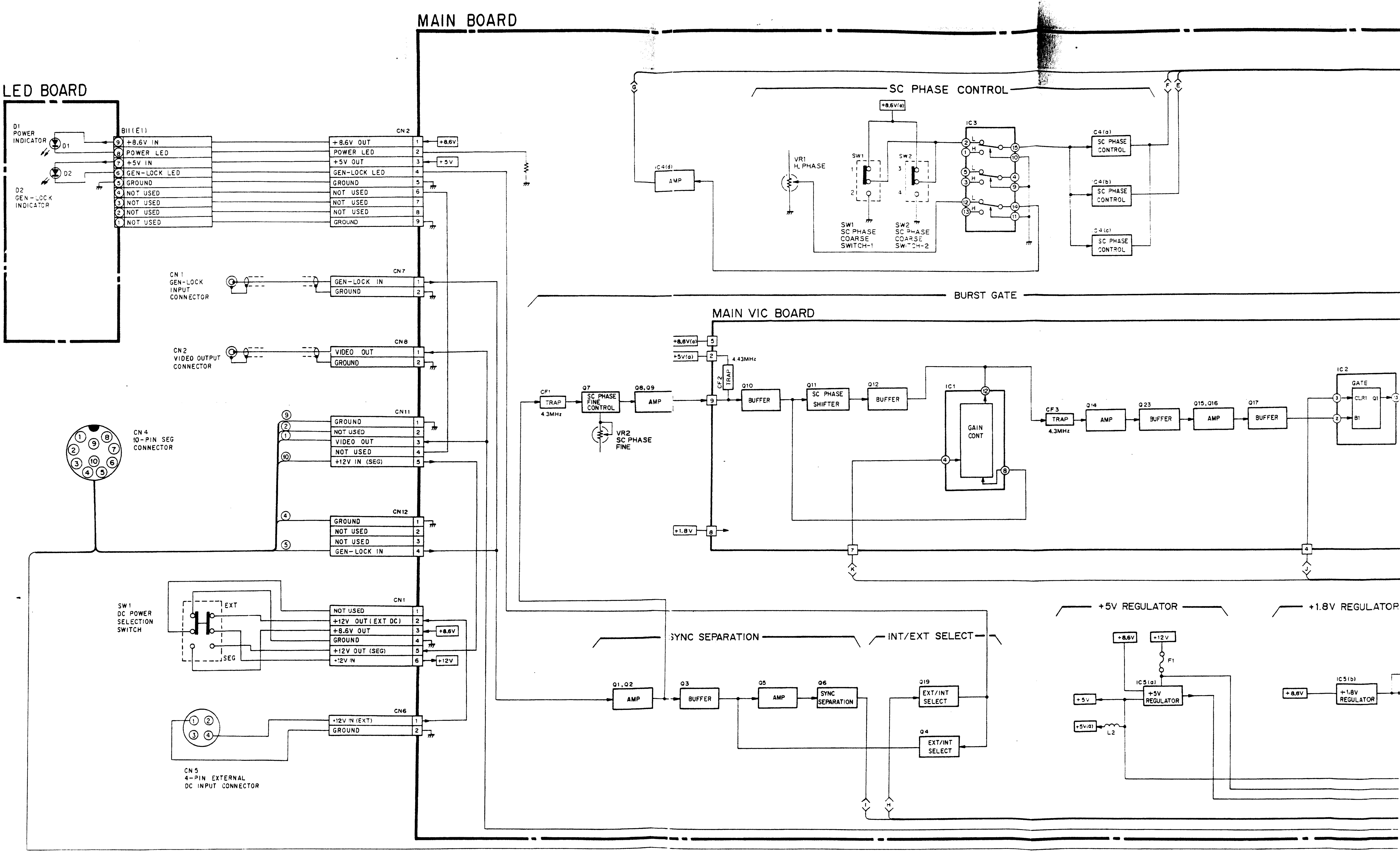
BLOCK DIAGRAM OF AUTOFOCUS BOARD FOR 8X AUTOFOCUS LENS WV-LZ14/8AF


AUTOFOCUS BOARD
CN4 LENS CONNECTOR
CN1
+1.8V IN
A/C DRIVE IN
A/C DAMPER IN
ZOOM DRIVE (TELE) IN
ZOOM DRIVE (WIDE) IN
CN2
+4.9V
GROUND
HALL OUT
AF SERIAL DATA IN
AF SERIAL CLOCK IN
AUTO PLAYBACK IN
CN3
+8.6V AF IN
+8.6V
HF AREA OUT
GROUND
(TO LENS UNIT ---CN2) CN4
ZOOM DRIVE(TELE) OUT
ZOOM DRIVE(WIDE) OUT
(TO LENS UNIT ---CN1) CN5
FOCUS DRIVE(NEAR) OUT
FOCUS DRIVE(FAR) OUT
(TO LENS UNIT ---CN3) CN6
A/C DAMPER OUT
A/C DRIVE OUT
+1.8V OUT
HALL (+) IN
HALL (-) IN
GROUND
(TO LENS UNIT ---CN4) CN7
AUTO MAN CONT IN
ONE SHOT WINDOW IN
BI MOLF DRIVE OUT
GROUND
ZOOM POSITION IN
FOCUS POSITION IN
+4V OUT
+4V
CF3
LPF (2.5MHz)
CF2
HF
MHF
CF1
MF
VHF
IC4
IC5
IC1
PRE AMP IN
CLAMP OUT
Y-AGC OUT
Y-AGC OUT
Y-AGC CAPA
HF IN
HF IN
HF C/H
Hs and GATE IN
BRIGHT DET OUT
M.MHF AMP OFFSET
MHF IN
S/H RESET IN
MF AGC
MF P/H
HF CLIP LEVEL
HF P/H
HF AGC
HF AMP OFFSET
HF DET OUT
NAM OUT
ENCODER B
ENCODER A
HF MOD OUT
MF IN
MF C-1
MF C-2
+4.9V
D1
D2
TP1 (A/F OFFSET)
VR1 A/F OFFSET
VR2 CLIP LEVEL
TP2 (CLIP LEVEL)
Q1,Q2
HF AGC
Q3,Q4
MF AMP
Q5,Q6
MF AGC
IC9(a)
BI-MOLF DRIVE AMP
TP8 BI-MOLF DRIVE
T1
Q12, Q13
SYNCHRONOUS DETECTION
IC2
GATE IN
VD/4 IN
DETECT PULSE B
DETECT PULSE A
BI-MOLF DRIVE
H GATE
Hs IN
V/F OUT
IRIS IN
IRIS OUT
F/Z IN
F/Z OUT
BI-MOLF CONT
A/D OUT C
A/D OUT B
A/D OUT A
A/D IN A
BPF IN A
BPF IN A
DIGIT OUT A
DIGIT OUT B
BPF IN B
BPF IN B
F SPEED CNTL
Z SPEED CNTL
FOCUS HOLD
FM DRIVE CW
FM CW
FM CCW
IC9(b)
Q7
AREA SIDE CONT
Q15
Hs BUFFER
Q10, Q11
ZOOM-FOCUS DRIVER
VR4 BI-MOLF GAIN
VR3 BI-MOLF OFFSET
VR5 BPF PHASE
VR6 HUNTING ADJ
Q8,Q9
FOCUS SAWTOOTH AMP
IC3
PA2 PA1 PA0 P92 P91 P90 P82 P81 P80 P73 P72 P71 P70
PB0 PB1 PB2 PB3
OSC2 OSC1 X1
P00 P01 P03 PC2 P10 P11
P63 P62 P61 P60
P53 EXT CONT
PC1 PC0
P52 PB DC
P51
P43 P42 P41 P40 P33
P12 P13 SIRO SBT SBI RST P20 P21 P22 P50 P51 P52
TP5 (IRIS OUT)
TP13 (FOCUS POSITION SELECT)
IC10
+4.3V
RESET PULSE GEN
Q14
GATE
IC6(a)
HIGH Y DET
VR7 LOW LEVEL DET
IC6(b)
LOW LIGHT
IC8(a),(b)
MF DET
TP11 (BI MOLF)
IC7(a)
BPF
IC8(c),(d)
INFOCUS DET
VR8 HALL OUT OFFSET
VR9 HALL OUT GAIN
TP4 (HALL OUT)
HALL AMP
IC7(d)

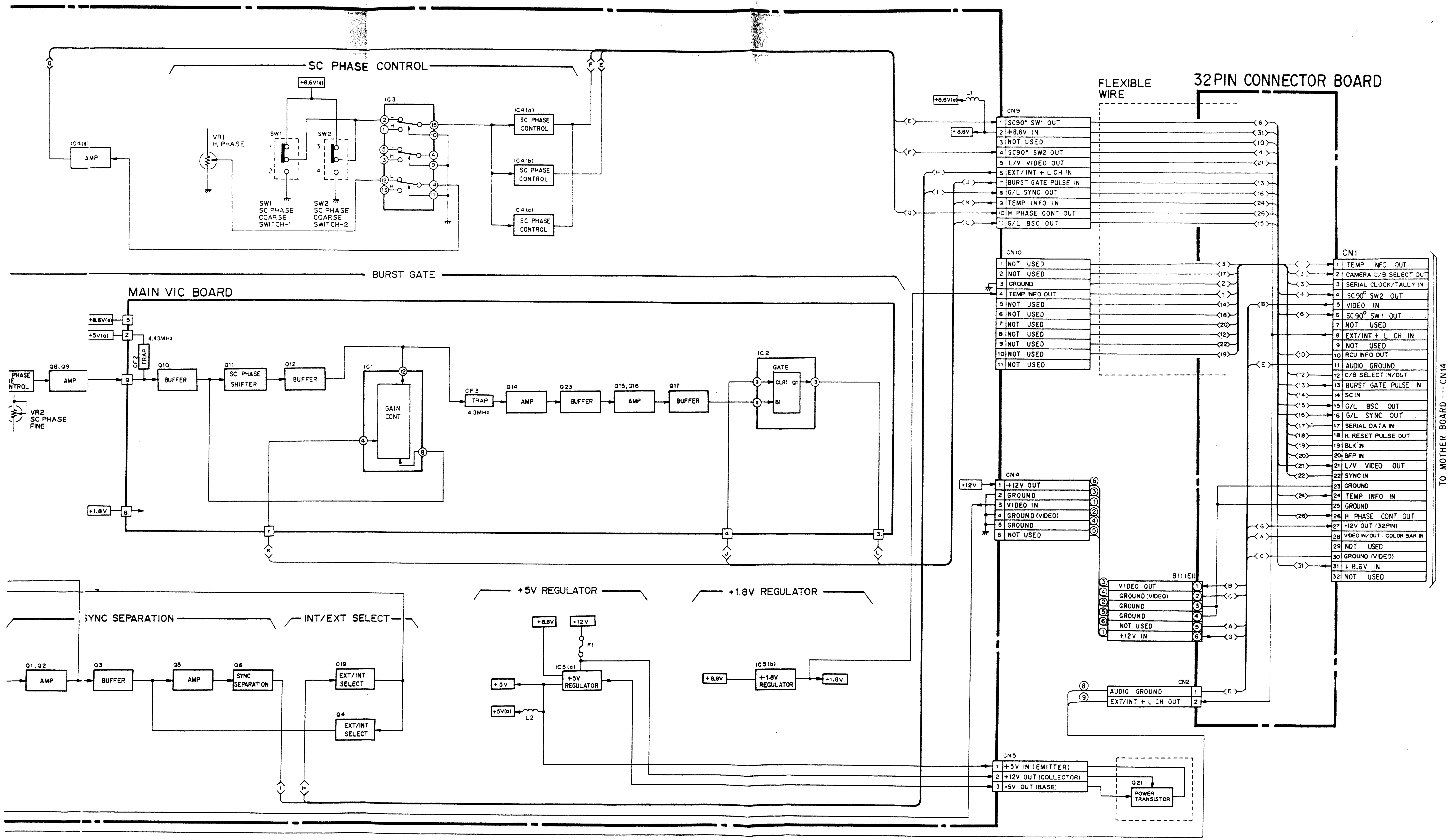
BLOCK DIAGRAM OF 1" VIEWFINDER WV-VF01


EVF BOARD
+8V REGULATOR
IC1
+5V REG
PROTECTION
TRIANGLE OSC
VR1
+8V ADJ
Q1
+8V REGULATOR
TP2(+8V)
+8V
F1
1A 125V
CN11
EVF CONNECTOR
CN1
+12V IN
STANDBY/L CH OUT
GROUND
GROUND
EVF VIDEO IN
EVF CHARACTER IN
TP1 (GND)
Q1
STANDBY CONT
+4.9V REGULATOR
+1.8V REGULATOR
IC1(a)
+4.9V REGULATOR
IC1(b)
+1.8V REGULATOR
+4.9V
+1.8V
Q3 - Q6
BUFFER AMP
Q7
BUFFER
Q8,Q9
BUFFER
Q2
AMP
EVF VIC BOARD
HIGH VOLTAGE
T1
FBT
Q2
SWITCHING
D3
D4
L6
H. SIZE
VR4
FOCUS
BI 2(E2)
G 3 OUT
G 2 OUT
G 1 OUT
H OUT
GROUND
VR5
CONTRAST
Q3
AMP
VR6
BRIGHT
CN2
H. DEF OUT
V. DEF (−) OUT
V. DEF (+) OUT
GROUND
VR2
V. SIZE
IC2
V. OSC
V. DEF
SYNC SEPA CLAMP
CHARACTER SELECT
LEVEL IND GENERATOR
MIX AMP
PHASE COMP
H OSC
TP3 (AFC)
VR3
AFC
CN10
CRT SOCKET
V101
L102
CRT DEFLECTION COIL
V. DEF
H. DEF
CRT
ANODE CAP
GROUND

BLOCK DIAGRAM OF GEN-LOCK ADAPTOR WV-AD36

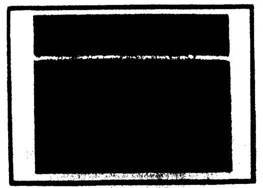

MAIN BOARD
LED BOARD
D1 POWER INDICATOR
D1
D2
D2 GEN-LOCK INDICATOR
B11(E1)
+8.6V IN
POWER LED
+5V IN
GEN-LOCK LED
GROUND
NOT USED
CN2
+8.6V OUT
POWER LED
+5V OUT
GEN-LOCK LED
GROUND
NOT USED
+8.6V
+5V
CN1 GEN-LOCK INPUT CONNECTOR
CN7
GEN-LOCK IN
GROUND
CN2 VIDEO OUTPUT CONNECTOR
CN8
VIDEO OUT
GROUND
CN4 10-PIN SEG CONNECTOR
CN11
GROUND
NOT USED
VIDEO OUT
NOT USED
+12V IN (SEG)
CN12
GROUND
NOT USED
NOT USED
GEN-LOCK IN
SW1 DC POWER SELECTION SWITCH
EXT
SEG
CN1
NOT USED
+12V OUT (EXT DC)
+8.6V OUT
GROUND
+12V OUT (SEG)
+12V IN
+8.6V
+12V
CN6
+12V IN (EXT)
GROUND
CN5 4-PIN EXTERNAL DC INPUT CONNECTOR
SC PHASE CONTROL
+8.6V(a)
IC4(d)
AMP
VR1 H. PHASE
SW1
SW2
IC3
L
H
IC4(a)
SC PHASE CONTROL
IC4(b)
SC PHASE CONTROL
IC4(c)
SC PHASE CONTROL
SW1 SC PHASE COARSE SWITCH-1
SW2 SC PHASE COARSE SWITCH-2
G
F
E
BURST GATE
MAIN VIC BOARD
+8.6V(a)
+5V(a)
4.43MHz
CF2 TRAP
CF1
TRAP
4.3MHz
Q7
SC PHASE FINE CONTROL
VR2 SC PHASE FINE
Q8,Q9
AMP
Q10
BUFFER
Q11
SC PHASE SHIFTER
Q12
BUFFER
IC1
GAIN CONT
CF3
TRAP
4.3MHz
Q14
AMP
Q23
BUFFER
Q15,Q16
AMP
Q17
BUFFER
IC2
GATE
CLR1
Q1
B1
+1.8V
K
J
SYNC SEPARATION
INT/EXT SELECT
Q1,Q2
AMP
Q3
BUFFER
Q5
AMP
Q6
SYNC SEPARATION
Q19
EXT/INT SELECT
Q4
EXT/INT SELECT
I
H
+5V REGULATOR
+8.6V
+12V
F1
IC5(a)
+5V REGULATOR
+5V
+5V(a)
L2
+1.8V REGULATOR
IC5(b)
+8.6V
+1.8V REGULATOR

BLOCK DIAGRAM OF GEN-LOCK ADAPTOR WV-AD36

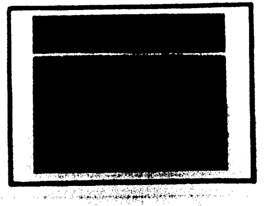

SC PHASE CONTROL
+8.6V(a)
IC3
IC4(a) SC PHASE CONTROL
IC4(b) SC PHASE CONTROL
IC4(c) SC PHASE CONTROL
IC4(d) AMP
VR1 H. PHASE
SW1
SW2
SW1 SC PHASE COARSE SWITCH-1
SW2 SC PHASE COARSE SWITCH-2
BURST GATE
MAIN VIC BOARD
+8.6V(a)
+5V(a)
4.43MHz
CF2 TRAP
PHASE
CONTROL
Q8, Q9 AMP
VR2 SC PHASE FINE
Q10 BUFFER
Q11 SC PHASE SHIFTER
Q12 BUFFER
IC1 GAIN CONT
CF3 TRAP 4.3MHz
Q14 AMP
Q23 BUFFER
Q15, Q16 AMP
Q17 BUFFER
IC2 GATE CLR1 Q1 B1
+1.8V
SYNC SEPARATION
INT/EXT SELECT
Q1, Q2 AMP
Q3 BUFFER
Q5 AMP
Q6 SYNC SEPARATION
Q19 EXT/INT SELECT
Q4 EXT/INT SELECT
+5V REGULATOR
+8.6V
+12V
F1
IC5(a) +5V REGULATOR
+5V
+5V(a)
L2
+1.8V REGULATOR
+8.6V
IC5(b) +1.8V REGULATOR
+1.8V
L1
+8.6V(a)
+8.6V
FLEXIBLE WIRE
32PIN CONNECTOR BOARD
CN9
1 SC90° SW1 OUT
2 +8.6V IN
3 NOT USED
4 SC90° SW2 OUT
5 L/V VIDEO OUT
6 EXT/INT + L CH IN
7 BURST GATE PULSE IN
8 G/L SYNC OUT
9 TEMP INFO IN
10 H PHASE CONT OUT
11 G/L BSC OUT
CN10
1 NOT USED
2 NOT USED
3 GROUND
4 TEMP INFO OUT
5 NOT USED
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
10 NOT USED
11 NOT USED
CN4
+12V
1 +12V OUT
2 GROUND
3 VIDEO IN
4 GROUND (VIDEO)
5 GROUND
6 NOT USED
B11(E1)
VIDEO OUT
GROUND (VIDEO)
GROUND
GROUND
NOT USED
+12V IN
CN2
AUDIO GROUND
EXT/INT + L CH OUT
CN5
1 +5V IN (EMITTER)
2 +12V OUT (COLLECTOR)
3 +5V OUT (BASE)
Q21 POWER TRANSISTOR
CN1
1 TEMP INFO OUT
2 CAMERA C/B SELECT OUT
3 SERIAL CLOCK/TALLY IN
4 SC90° SW2 OUT
5 VIDEO IN
6 SC90° SW1 OUT
7 NOT USED
8 EXT/INT + L CH IN
9 NOT USED
10 RCU INFO OUT
11 AUDIO GROUND
12 C/B SELECT IN/OUT
13 BURST GATE PULSE IN
14 SC IN
15 G/L BSC OUT
16 G/L SYNC OUT
17 SERIAL DATA IN
18 H. RESET PULSE OUT
19 BLK IN
20 BFP IN
21 L/V VIDEO OUT
22 SYNC IN
23 GROUND
24 TEMP INFO IN
25 GROUND
26 H PHASE CONT OUT
27 +12V OUT (32PIN)
28 VIDEO IN/OUT : COLOR BAR IN
29 NOT USED
30 GROUND (VIDEO)
31 + 8.6V IN
32 NOT USED
TO MOTHER BOARD---CN14

SCHEMATIC DIAGRAM OF CCD AND CCD DRIVE BOA

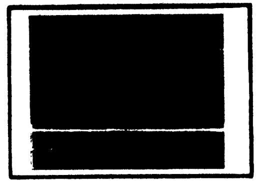
1. 2V/DIV, 2ms/DIV



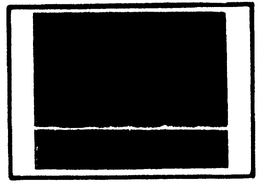
2. 2V/DIV, 2ms/DIV



3. 2V/DIV, 5ms/DIV

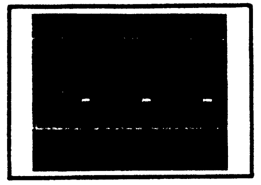


4. 2V/DIV, 5ms/DIV



5. 50mV/DIV, 20μs/DIV

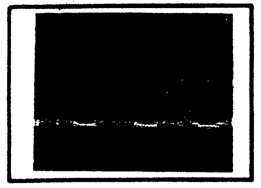
6. 0.5V/DIV, 20μs/DIV



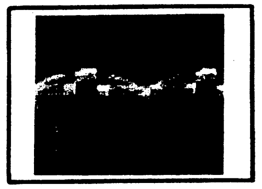
7. 1V/DIV, 20μs/DIV

8. 1V/DIV, 20μs/DIV

9. 0.5V/DIV, 20μs/DIV



10. 0.1V/DIV, 10μs/DIV

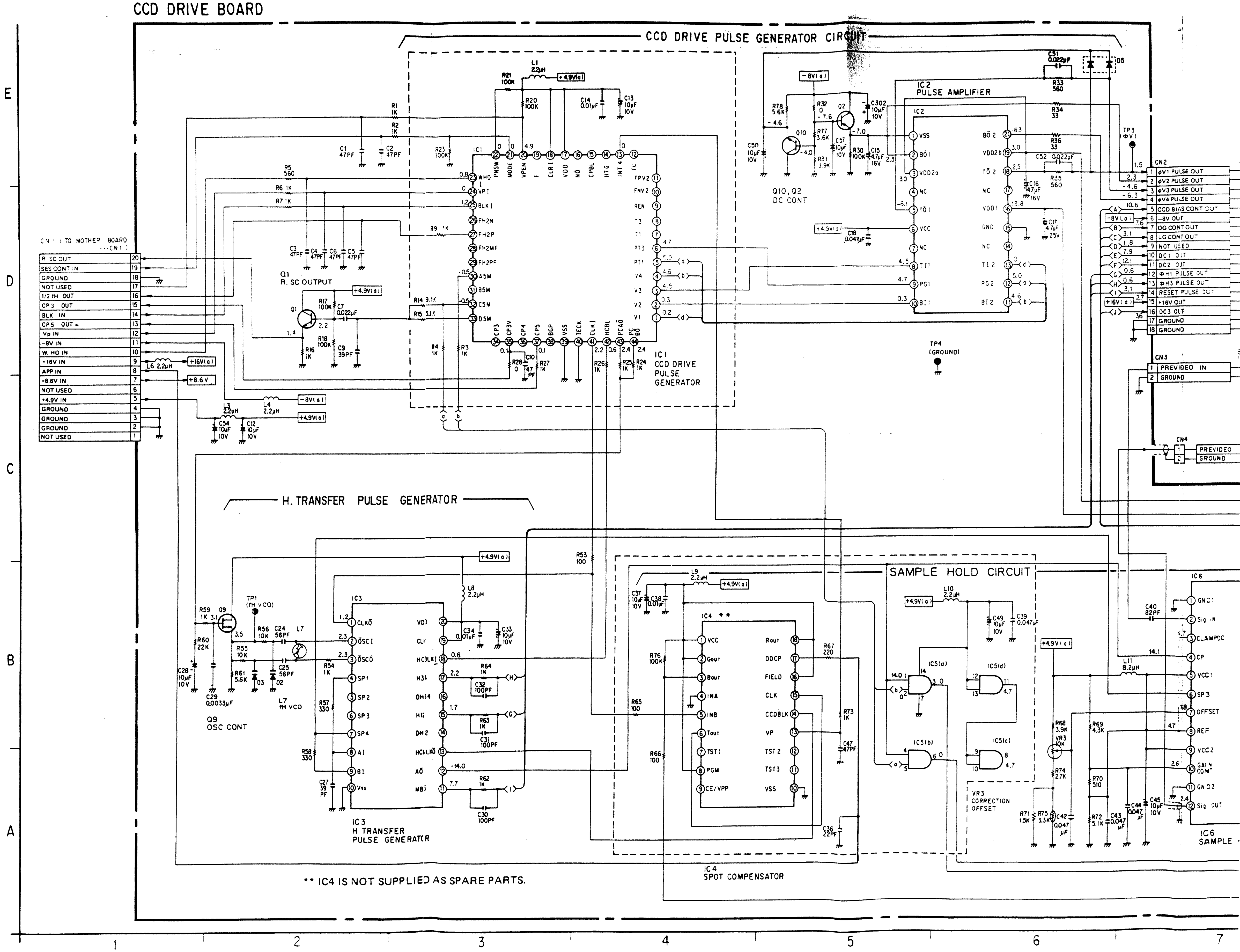


CCD BOARD

IC1	MN6741F		D8, E8
IC2	YFCXB0026M		D10
Q1	2SC2404-CD	[U]	E10
Q2	2SA1022-CTW	[E]	E10
Q3	2SA1022-CTW	[E]	E10
Q4	2SC2404-CD	[U]	E10
Q5	2SC2404-CD	[U]	D9
D1	MA151K	[MH]	E9
D2	MA151WA	[MN]	D9

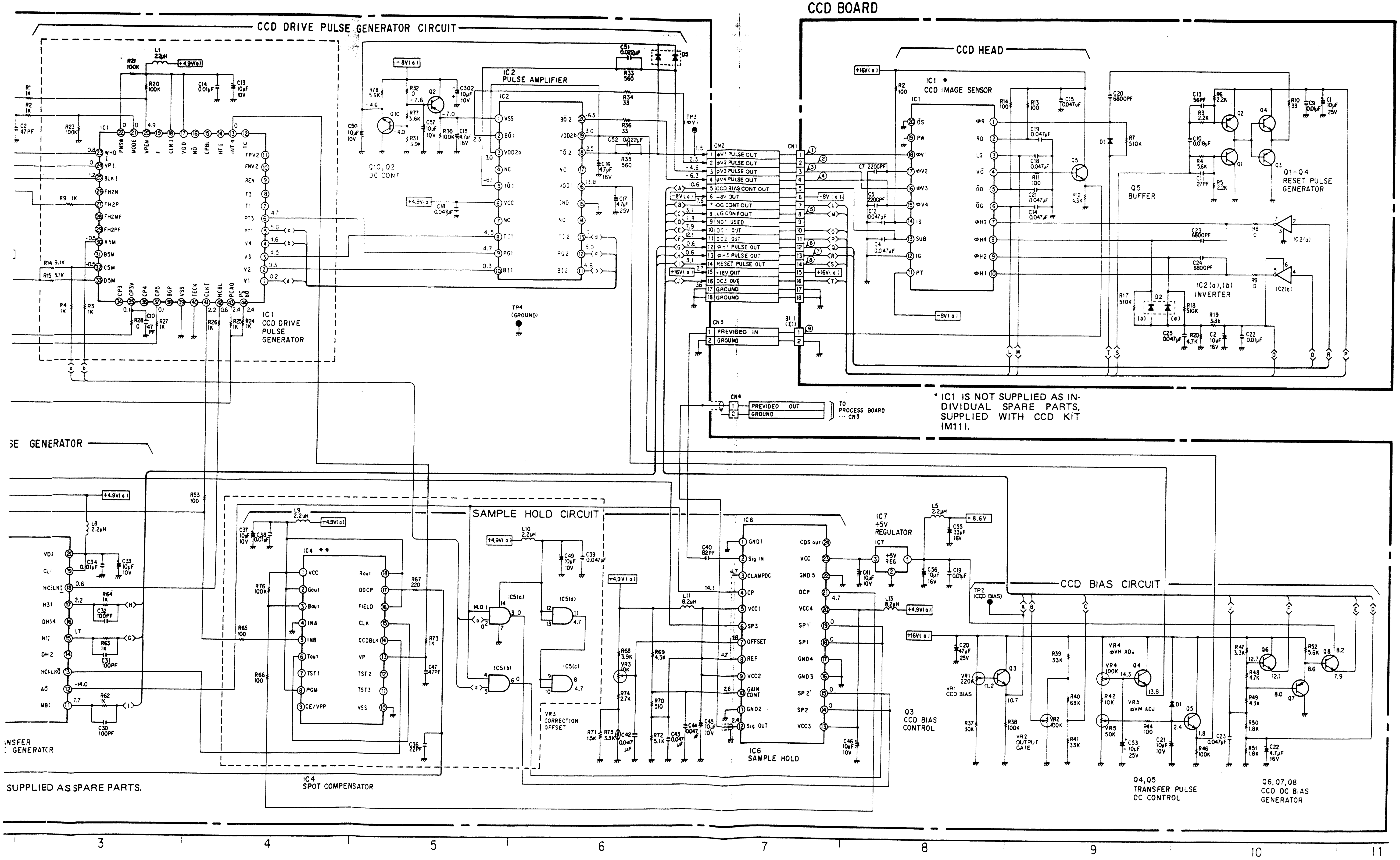
CCD DRIVE BOARD

IC1	MN51007LVH		D3, D4
IC2	UPD6146G		D6, E6
IC3	MN50003LVE		B3
IC4	MN6109		B4, B5
IC5	MN74HC08S		B6, B5
IC6	M51266FP		B7
IC7	YFNJM2930L05		B8
Q1	2SD601-QR	[Y]	D2
Q2	2SB710-Q	[C]	E5
Q3	2SD601-QR	[Y]	A8
Q4	2SD602-QRS	[W]	A9
Q5	2SD602-QRS	[W]	A10
Q6	2SD602-QRS	[W]	B10
Q7	2SB710-Q	[C]	A10
Q8	2SD973A-RS		B10
Q9	2SK198-Q	[1O]	B2
Q10	2SD602-QRS	[W]	E5
D1	MA151K	[MH]	A9
D2	1SV153		B2
D3	1SV153		B2
D5	MA151WA	[MN]	E6


CCD DRIVE BOARD
CCD DRIVE PULSE GENERATOR CIRCUIT
IC1 CCD DRIVE PULSE GENERATOR
IC2 PULSE AMPLIFIER
Q10, Q2 DC CONT
Q1 R. SC OUTPUT
CN1 (TO MOTHER BOARD ---CN1)
20 R SC OUT
19 SES CONT IN
18 GROUND
17 NOT USED
16 1/2 fH OUT
15 CP3 OUT
14 BLK IN
13 CP5 OUT
12 Vp IN
11 −8V IN
10 W. HD IN
9 +16V IN
8 APP IN
7 +8.6V IN
6 NOT USED
5 +4.9V IN
4 GROUND
3 GROUND
2 GROUND
1 NOT USED
L6 2.2μH
+16V(a)
+8.6V
−8V(a)
+4.9V(a)
CN2
1 φV1 PULSE OUT
2 φV2 PULSE OUT
3 φV3 PULSE OUT
4 φV4 PULSE OUT
5 CCD BIAS CONT OUT
6 −8V OUT
7 OG CONT OUT
8 LG CONT OUT
9 NOT USED
10 DC1 OUT
11 DC2 OUT
12 ΦH1 PULSE OUT
13 ΦH3 PULSE OUT
14 RESET PULSE OUT
15 +16V OUT
16 DC3 OUT
17 GROUND
18 GROUND
CN3
1 PREVIDEO IN
2 GROUND
CN4
1 PREVIDEO
2 GROUND
TP3 (ΦV)
TP4 (GROUND)
TP1 (fH VCO)
H. TRANSFER PULSE GENERATOR
Q9 OSC CONT
IC3 H TRANSFER PULSE GENERATOR
SAMPLE HOLD CIRCUIT
IC4 **
IC4 SPOT COMPENSATOR
IC5(a)
IC5(b)
IC5(c)
IC5(d)
VR3 CORRECTION OFFSET
IC6 SAMPLE
E
D
C
B
A
1
2
3
4
5
6
7

** IC4 IS NOT SUPPLIED AS SPARE PARTS.

SCHEMATIC DIAGRAM OF CCD AND CCD DRIVE BOARD


CCD DRIVE PULSE GENERATOR CIRCUIT
IC1 CCD DRIVE PULSE GENERATOR
IC2 PULSE AMPLIFIER
Q10, Q2 DC CONT
TP3 (ΦV)
TP4 (GROUND)
CN2
CN1
CN3
CN4
PREVIDEO OUT
GROUND
TO PROCESS BOARD … CN3
CCD BOARD
CCD HEAD
IC1 * CCD IMAGE SENSOR
Q5 BUFFER
Q1-Q4 RESET PULSE GENERATOR
IC2(a),(b) INVERTER
SE GENERATOR
NSFER GENERATOR
SAMPLE HOLD CIRCUIT
IC4 **
IC4 SPOT COMPENSATOR
IC5(a)
IC5(b)
IC5(c)
IC5(d)
VR3 CORRECTION OFFSET
IC6 SAMPLE HOLD
IC7 +5V REGULATOR
TP2 (CCD BIAS)
CCD BIAS CIRCUIT
Q3 CCD BIAS CONTROL
VR1 CCD BIAS
VR2 OUTPUT GATE
VR4 ΦVH ADJ
VR5 ΦVH ADJ
Q4, Q5 TRANSFER PULSE DC CONTROL
Q6, Q7, Q8 CCD DC BIAS GENERATOR
+4.9V(a)
-8V(a)
+16V(a)
+8.6V
3
4
5
6
7
8
9
10
11

* IC1 IS NOT SUPPLIED AS INDIVIDUAL SPARE PARTS, SUPPLIED WITH CCD KIT (M11).

SUPPLIED AS SPARE PARTS.

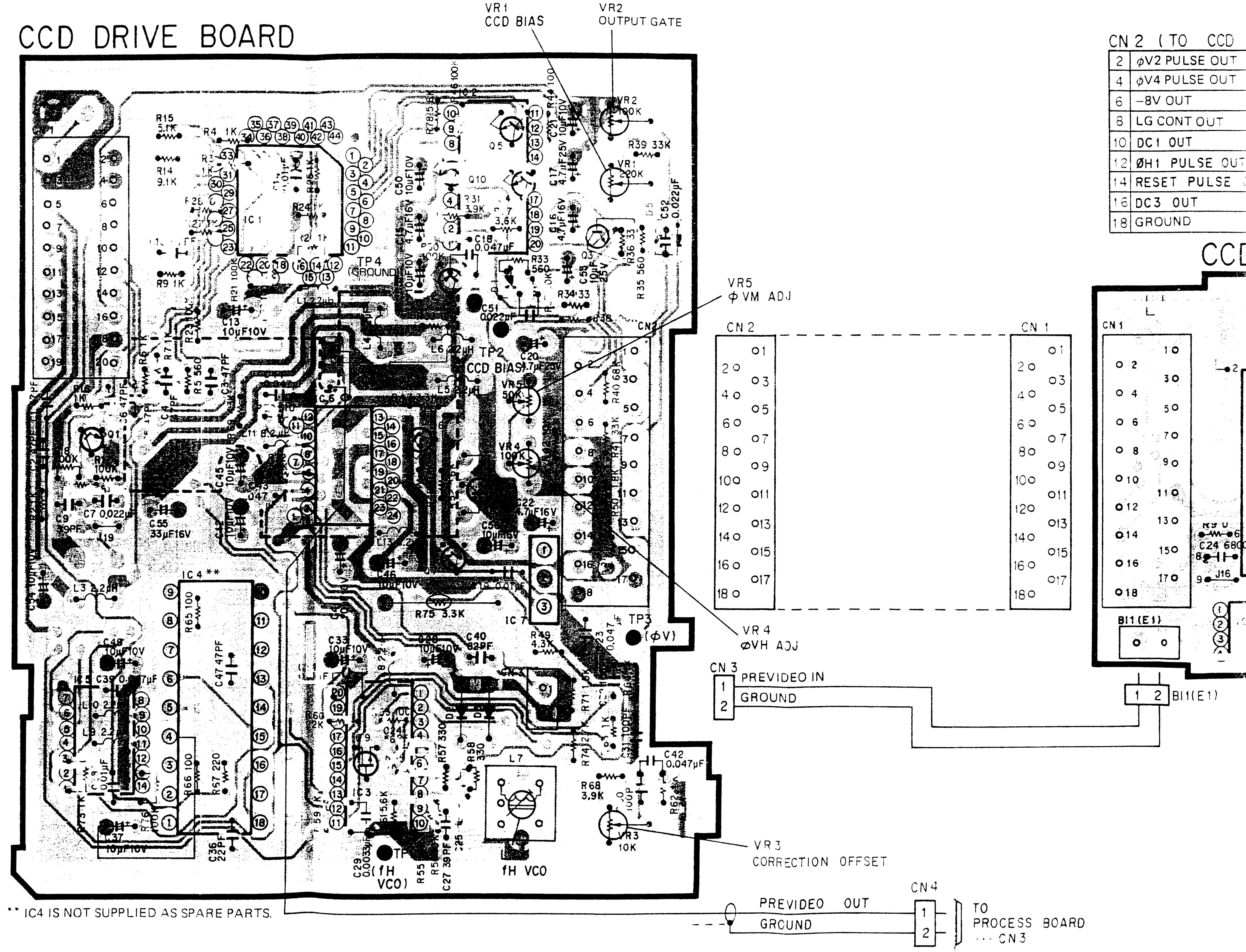
CONDUCTOR VIEW OF CCD AND CCD DRIVE BOARD

CN 1 (TO MOTHER BOARD--- CN 1)

1	NOT USED	2	GROUND
3	GROUND	4	GROUND
5	+4.9V IN	6	NOT USED
7	+8.6V IN	8	APP IN
9	+16V IN	10	W. HD IN
11	−8V IN	12	Vp IN
13	CP 5 OUT	14	BLK IN
15	CP 3 OUT	16	1/2 fH OUT
17	NOT USED	18	GROUND
19	SES CONT IN	20	R. SC OUT

CN 2 (TO CCD

2	φV2 PULSE OUT
4	φV4 PULSE OUT
6	−8V OUT
8	LG CONT OUT
10	DC1 OUT
12	ØH1 PULSE OUT
14	RESET PULSE
16	DC3 OUT
18	GROUND


CCD DRIVE BOARD
VR1
CCD BIAS
VR2
OUTPUT GATE
VR5
φ VM ADJ
VR 4
φVH ADJ
VR 3
CORRECTION OFFSET
CN 2
CN 1
CN 3
1 PREVIDEO IN
2 GROUND
CN 4
PREVIDEO OUT
GROUND
TO
PROCESS BOARD
··· CN 3
BI1(E1)
TP4 (GROUND)
TP2 CCD BIAS
TP3 (φV)
TP (fH VCO)
fH VCO
L7
IC1
IC4 **
IC7
IC3
IC5
R75 3.3K
R49 4.3K
R39 33K
R68 3.9K
C42 0.047μF
C55 33μF16V
C13 10μF10V
C7 0.022μ
C9 39PF
L3 2.2μH
C48 10μF10V
C33 10μF10V
C40 82PF
C37 10μF10V
C36 22PF
C29 0.0033μF
C27 39PF
R15 5.1K
R14 9.1K
R4 1K
R9 1K
R65 100
R66 100
R67 220
C47 47PF
CCD

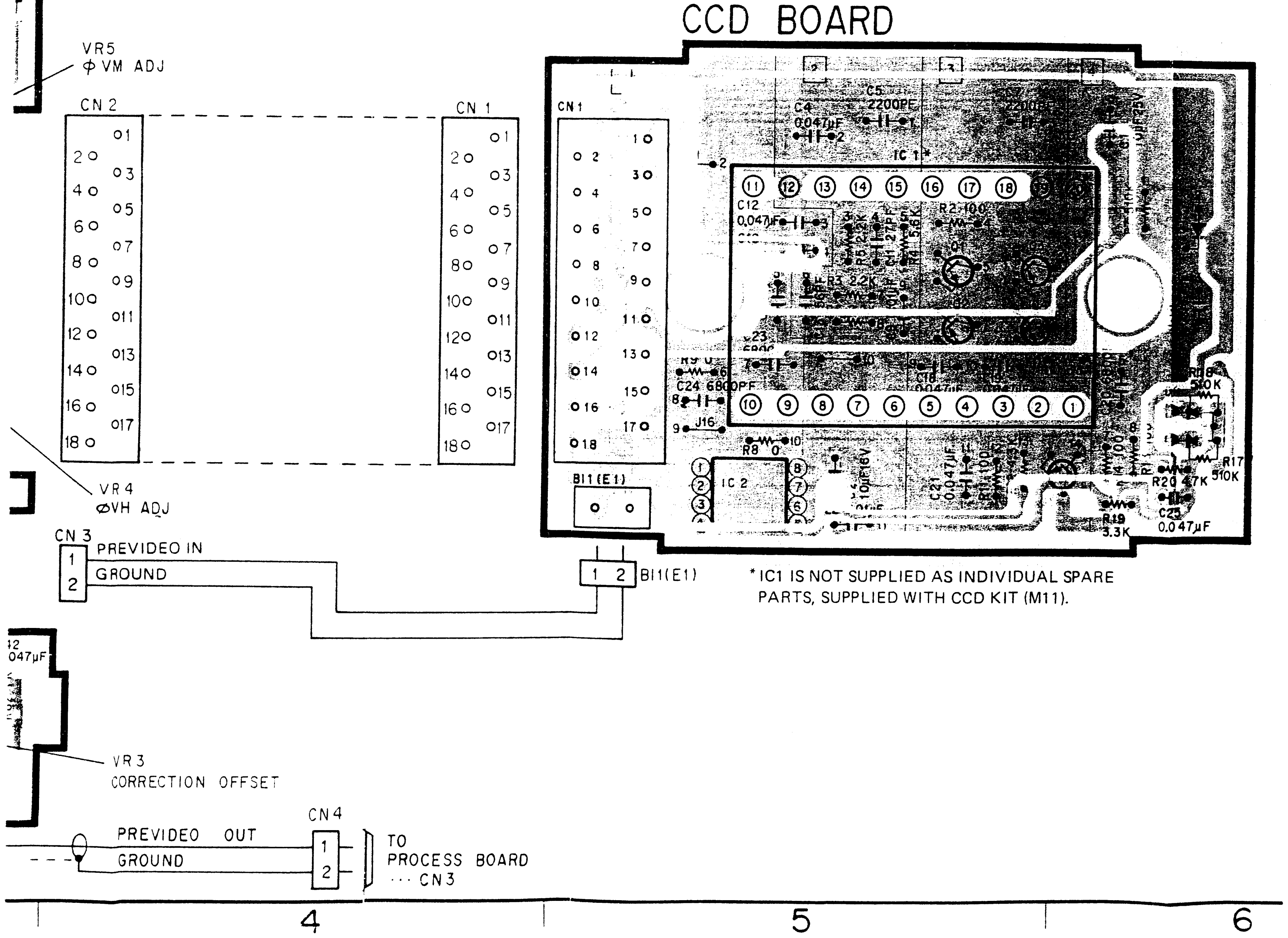
** IC4 IS NOT SUPPLIED AS SPARE PARTS.

●—W—● COMPONENT SIDE
●—W—● PATTERN SIDE

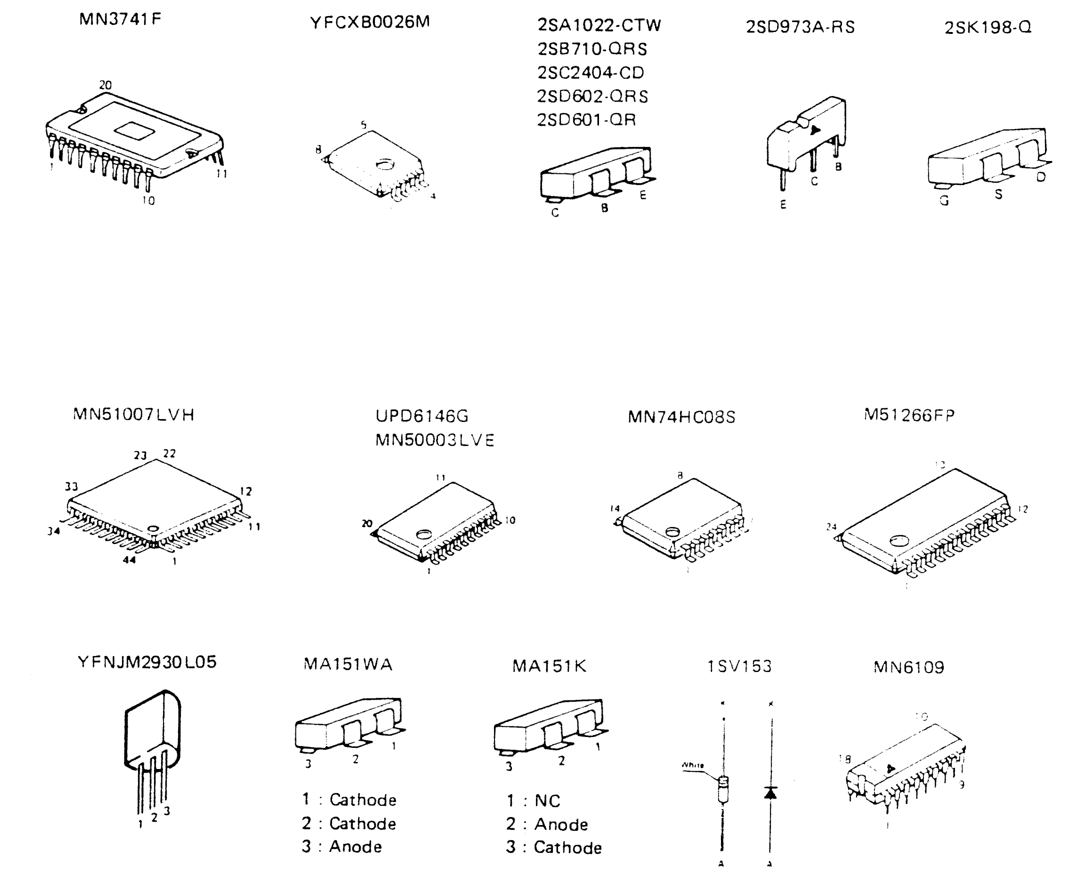
UCTOR VIEW OF CCD AND CCD DRIVE BOARD

CN 2 (TO CCD BOARD---CN1)

2	φV2 PULSE OUT	1	φV1 PULSE OUT
4	φV4 PULSE OUT	3	φV3 PULSE OUT
6	−8V OUT	5	CCD BIAS CONT OUT
8	LG CONT OUT	7	OG CONT OUT
10	DC1 OUT	9	NOT USED
12	ØH1 PULSE OUT	11	DC2 OUT
14	RESET PULSE OUT	13	ØH3 PULSE OUT
16	DC3 OUT	15	+16V OUT
18	GROUND	17	GROUND


CCD BOARD
VR5
φ VM ADJ
CN 2
CN 1
VR 4
φVH ADJ
CN 3
PREVIDEO IN
GROUND
1
2
BI1(E1)
IC 1*
IC 2
C4 0.047μF
C5 2200PF
C12 0.047μF
R2 100
R3 22K
C24 680PF
J16
R8 0
R18 510K
R17 510K
R20 47K
R19 3.3K
C25 0.047μF
VR 3
CORRECTION OFFSET
CN4
PREVIDEO OUT
GROUND
TO
PROCESS BOARD
··· CN3
4
5
6

*IC1 IS NOT SUPPLIED AS INDIVIDUAL SPARE PARTS, SUPPLIED WITH CCD KIT (M11).


MN3741F
YFCXB0026M
2SA1022-CTW
2SB710-QRS
2SC2404-CD
2SD602-QRS
2SD601-QR
C B E
2SD973A-RS
E C B
2SK198-Q
G S D
MN51007LVH
UPD6146G
MN50003LVE
MN74HC08S
M51266FP
YFNJM2930L05
MA151WA
1 : Cathode
2 : Cathode
3 : Anode
MA151K
1 : NC
2 : Anode
3 : Cathode
1SV153
MN6109

CCD BOARD

IC1	MN3741F		B5
IC2	YFCXB0026M		A5
Q1	2SC2404-CD	[U]	B5
Q2	2SA1022-CTW	[E]	B5
Q3	2SA1022-CTW	[E]	B5
Q4	2SC2404-CD	[U]	B5
Q5	2SC2404-CD	[U]	A6
D1	MA151K	[MH]	B6
D2	MA151WA	[MN]	A6

CCD DRIVE BOARD

IC1	MN51007LVH		B2
IC2	UPD6146G		B3
IC3	MN50003LVE		A3
IC4	MN6109		A2
IC5	MN74HC08S		A2
IC6	M51266FP		B2
IC7	YFNJM2930L05		A3
Q1	2SD601-QR	[Y]	B2
Q2	2SB710-Q	[C]	B3
Q3	2SD601-QR	[Y]	B3
Q4	2SD602-QRS	[W]	B3
Q5	2SD602-QRS	[W]	B3
Q6	2SD602-QRS	[W]	B3
Q7	2SB710-Q	[C]	A3
Q8	2SD973A-RS		B3
Q9	2SK198-Q	[10]	A3
Q10	2SD602-QRS	[W]	B3
D1	MA151K	[MH]	B3
D2	1SV153		A3
D3	1SV153		A3
D5	MA151WA	[MN]	B3

SCHEMATIC DIAGRAM OF PROC

PROCESS BOARD

IC1	HB31		E3, E4
IC2	HB12		D3, D4
IC3	HB18		C3
IC4	NJM4053BM		D5
IC5	AN2361S		D6, D7
IC6	MN3106S		C9
IC7	AN2210SA		A10, A11
IC8	HB16		E17
Q1	2SB709-Q	[A]	E10
Q2	2SD601-QR	[Y]	D5
Q3	2SD601-QR	[Y]	D5
Q4	2SC2404-CD	[U]	E9
Q5	2SC2404-CD	[U]	E9
Q6	2SD601-QR	[Y]	E9
Q7	2SB709-Q	[A]	E9
Q8	2SK198-Q	[10]	B8
Q9	2SC2404-CD	[U]	B8
Q10	2SD601-QR	[Y]	B8
Q11	2SB709-Q	[A]	B11
Q12	2SD601-QR	[Y]	B16
Q13	2SD601-QR	[Y]	B7
Q14	2SB709-Q	[A]	B7
Q15	2SC2404-CD	[U]	B7
Q16	2SD601-QR	[Y]	B7
Q17	2SD601-QR	[Y]	A8
Q20	2SC2404-CD	[U]	A7
D1	MA151K	[MH]	B11
D2	MA151K	[MH]	B11
D301	MA165		E2

PROCESS VIC-1 BOARD

IC1	AN2410S		D14
IC2	NJM319M		C14
Q1	2SD601-QR	[Y]	D13
Q2	2SD601-QR	[Y]	E13
Q3	2SD601-QR	[Y]	D13
Q4	2SD601-QR	[Y]	D13
Q5	2SK198-Q	[10]	E15
Q6	2SK198-Q	[10]	E16
Q7	2SD601-QR	[Y]	D16
Q8	2SC2404-CD	[U]	D16
Q9	2SB709-Q	[A]	C15
Q10	2SB709-Q	[A]	C16
Q11	2SA1022-CD	[E]	B14
Q12	2SC2404-CD	[U]	B13
Q13	2SD601-QR	[Y]	B14
Q14	2SD601-QR	[Y]	B15
Q15	2SB709-Q	[A]	B15
D1	MA151K	[MH]	E14

PROCESS VIC-2 BOARD

IC1	NJM2902M		B5, B6
Q1	2SC2405STU	[S]	E6
Q2	2SC2404-CD	[U]	E6
Q3	2SC2404-CD	[U]	E6

PROCESS VIC-3 (a) BOARD

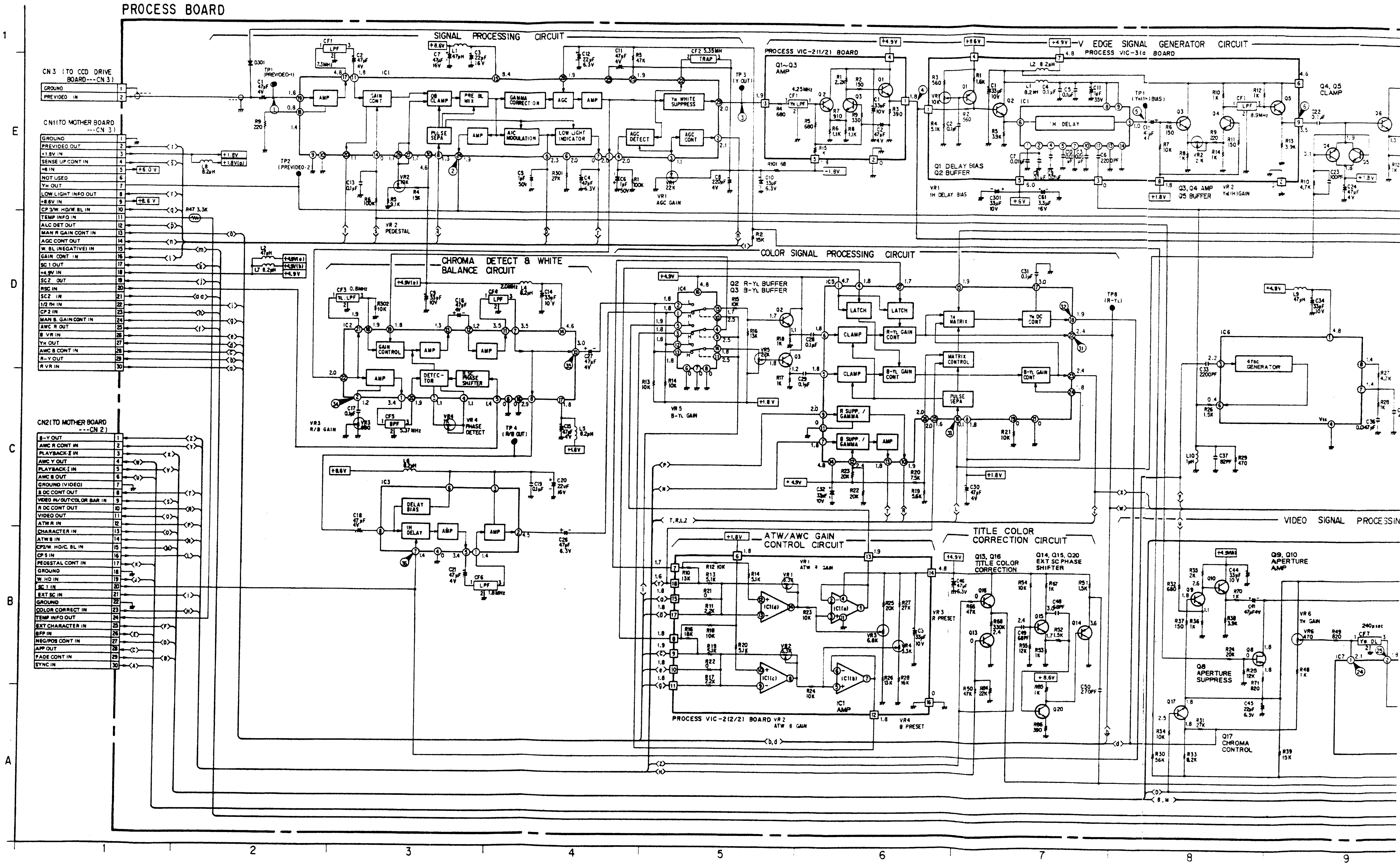
IC1	MN3802A		E7
Q1	2SB709-Q	[A]	E7
Q2	2SD601-QR	[Y]	E7
Q3	2SC2404-CD	[U]	E8
Q4	2SC2404-CD	[U]	E8
Q5	2SD601-QR	[Y]	E9

PROCESS VIC-3 (b) BOARD

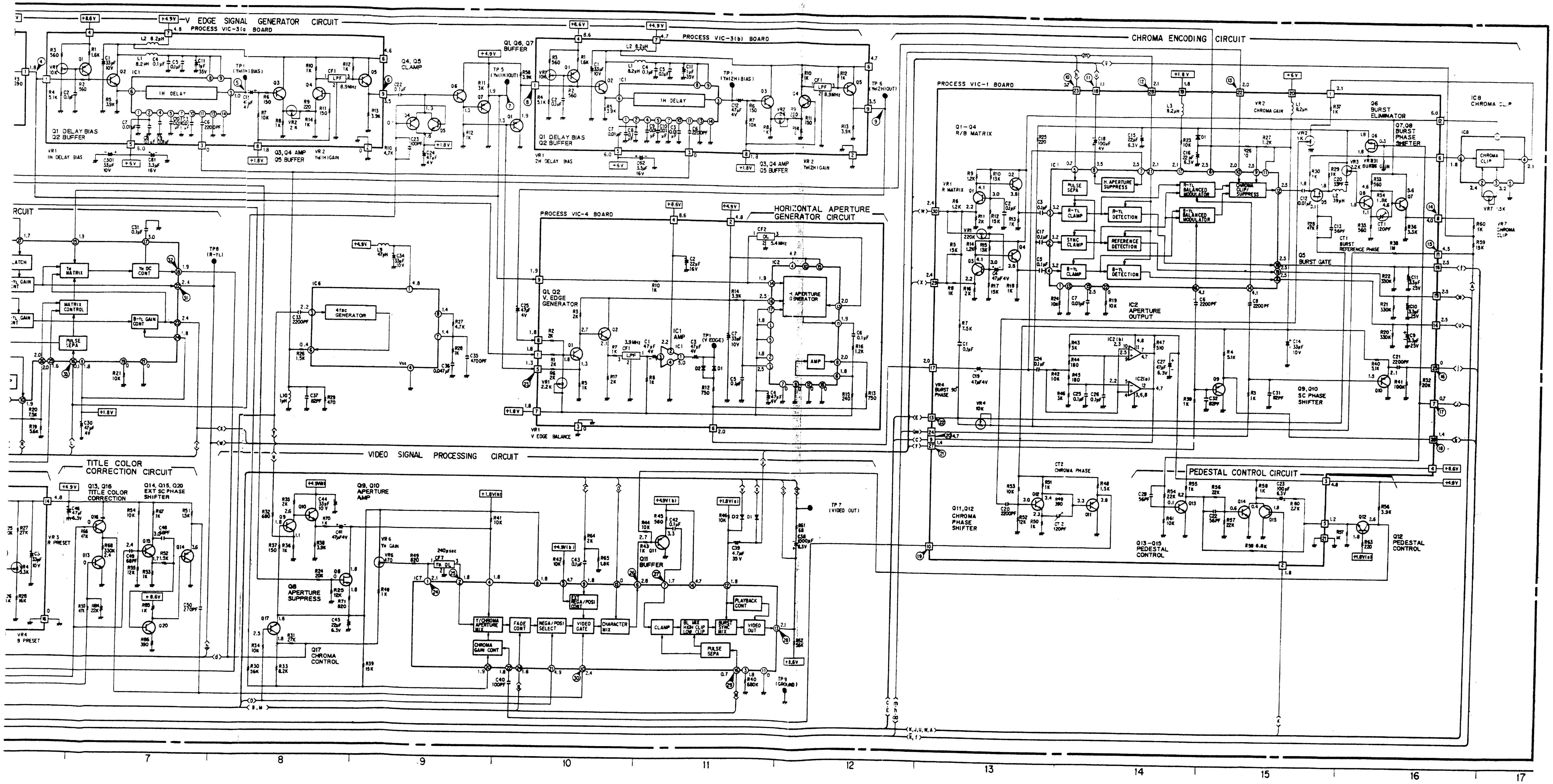
IC1	MN3802A		E11
Q1	2SB709-Q	[A]	E10
Q2	2SD601-QR	[Y]	E10
Q3	2SC2404-CD	[U]	E11
Q4	2SC2404-CD	[U]	E12
Q5	2SD601-QR	[Y]	E12

PROCESS VIC-4 BOARD

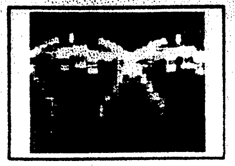
IC1	AN608		C11
IC2	AN2020S		C12, D12
Q1	2SC2404-CD	[U]	C10
Q2	2SD601-QR	[Y]	C10
D1	1SS108		C11
D2	1SS108		C11


PROCESS BOARD
SIGNAL PROCESSING CIRCUIT
V EDGE SIGNAL GENERATOR CIRCUIT
PROCESS VIC-2(1/2) BOARD
PROCESS VIC-3(a) BOARD
CN3 (TO CCD DRIVE BOARD---CN3)
CN1(TO MOTHER BOARD ---CN 3)
CN2(TO MOTHER BOARD ---CN 2)
CHROMA DETECT & WHITE BALANCE CIRCUIT
COLOR SIGNAL PROCESSING CIRCUIT
ATW/AWC GAIN CONTROL CIRCUIT
PROCESS VIC-2(2/2) BOARD
TITLE COLOR CORRECTION CIRCUIT
VIDEO SIGNAL PROCESSIN
E
D
C
B
A
1
2
3
4
5
6
7
8
9

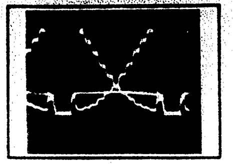
SCHEMATIC DIAGRAM OF PROCESS BOARD


V EDGE SIGNAL GENERATOR CIRCUIT
PROCESS VIC-3(a) BOARD
PROCESS VIC-3(b) BOARD
1H DELAY
Q1 DELAY BIAS
Q2 BUFFER
Q3, Q4 AMP
Q5 BUFFER
Q4, Q5 CLAMP
Q1, Q6, Q7 BUFFER
CHROMA ENCODING CIRCUIT
PROCESS VIC-1 BOARD
Q1–Q4 R/B MATRIX
PULSE SEPA
H. APERTURE SUPPRESS
R-Y CLAMP
R-Y DETECTION
SYNC CLAMP
REFERENCE DETECTION
B-Y CLAMP
B-Y DETECTION
R-Y BALANCED MODULATOR
B-Y BALANCED MODULATOR
CHROMA CLIP/SUPPRESS
IC2 APERTURE OUTPUT
Q6 BURST ELIMINATOR
Q7, Q8 BURST PHASE SHIFTER
Q5 BURST GATE
IC8 CHROMA CLIP
Q9, Q10 SC PHASE SHIFTER
PROCESS VIC-4 BOARD
HORIZONTAL APERTURE GENERATOR CIRCUIT
H APERTURE GENERATOR
AMP
Q1, Q2 V. EDGE GENERATOR
IC1 AMP
VR1 V EDGE BALANCE
IC6
4fsc GENERATOR
TITLE COLOR CORRECTION CIRCUIT
Q13, Q16 TITLE COLOR CORRECTION
Q14, Q15, Q20 EXT SC PHASE SHIFTER
Y/I MATRIX
Y/I DC CONT
MATRIX CONTROL
B-Y GAIN CONT
PULSE SEPA
VR3 R PRESET
VR4 B PRESET
VIDEO SIGNAL PROCESSING CIRCUIT
Q9, Q10 APERTURE AMP
Q8 APERTURE SUPPRESS
Q17 CHROMA CONTROL
VR6 Y/I GAIN
Y/I DL
Y/CHROMA APERTURE MIX
FADE CONT
NEGA/POSI SELECT
VIDEO GATE
CHARACTER MIX
NEGA/POSI CONT
CHROMA GAIN CONT
Q11 BUFFER
CLAMP
BL MIX HIGH CLIP LOW CLIP
BURST SYNC MIX
VIDEO OUT
PLAYBACK CONT
PULSE SEPA
TP7 (VIDEO OUT)
TP9 (GROUND)
Q11, Q12 CHROMA PHASE SHIFTER
CT2 CHROMA PHASE
PEDESTAL CONTROL CIRCUIT
Q13–Q15 PEDESTAL CONTROL
Q12 PEDESTAL CONTROL
7
8
9
10
11
12
13
14
15
16
17

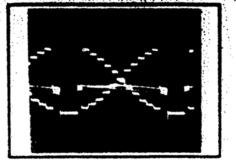
1. 50mV/DIV, 10μs/DIV



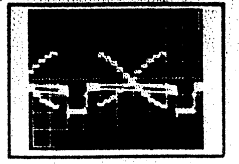
2. 0.1V/DIV, 10μs/DIV



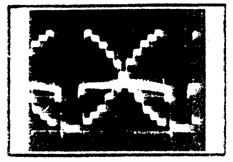
3. 0.1V/DIV, 10μs/DIV



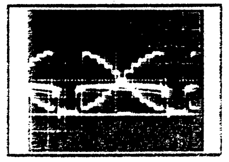
4. 0.1V/DIV, 10μs/DIV



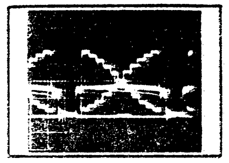
5. 0.1V/DIV, 10μs/DIV



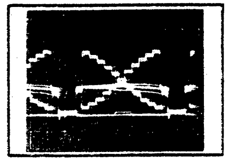
6. 0.1V/DIV, 10μs/DIV



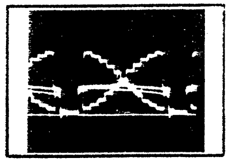
7. 0.1V/DIV, 10μs/DIV



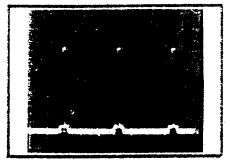
8. 0.1V/DIV, 10μs/DIV



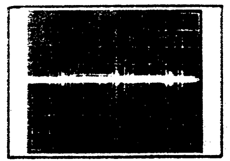
9. 0.1V/DIV, 10μs/DIV



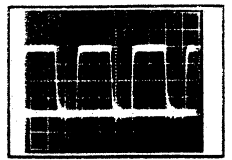
10. 1V/DIV, 20μs/DIV



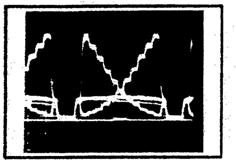
11. 0.1V/DIV, 20μs/DIV



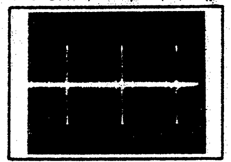
12. 0.2V/DIV, 20μs/DIV



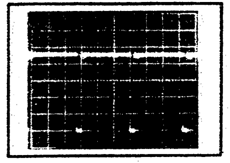
13. 0.1V/DIV, 10μs/DIV



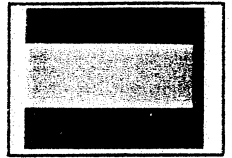
14. 0.1V/DIV, 20μs/DIV



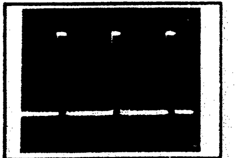
15. 1V/DIV, 20μs/DIV



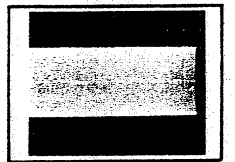
16. 0.1V/DIV, 20μs/DIV



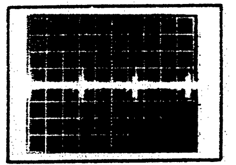
17. 1V/DIV, 20μs/DIV



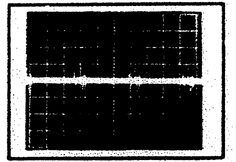
18. 0.1V/DIV, 20μs/DIV



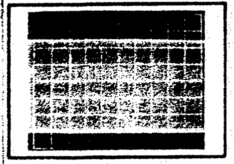
19. 50mV/DIV, 20μs/DIV



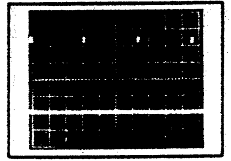
20. 50mV/DIV, 20μs/DIV



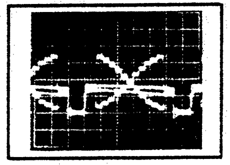
21. 0.2mV/DIV, 20μs/DIV



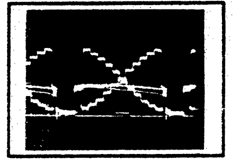
22. 1V/DIV, 20μs/DIV



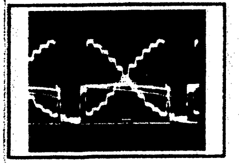
23. 0.1V/DIV, 10μs/DIV



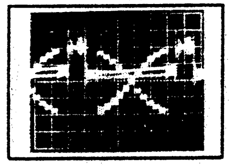
24. 20mV/DIV, 10μs/DIV



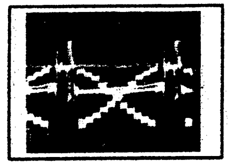
25. 50mV/DIV, 10μs/DIV



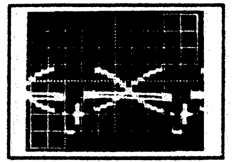
26. 0.2V/DIV, 10μs/DIV



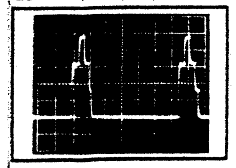
27. 0.2V/DIV, 10μs/DIV



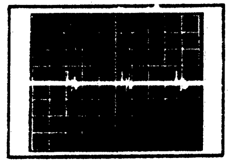
28. 0.5V/DIV, 10μs/DIV



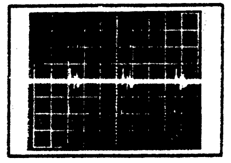
29. 1V/DIV, 10μs/DIV



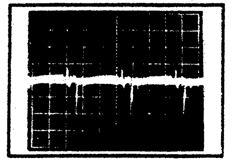
30. 0.2V/DIV, 20μs/DIV



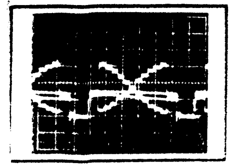
31. 20mV/DIV, 20μs/DIV



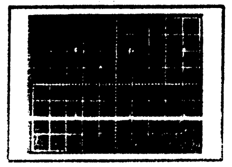
32. 0.2V/DIV, 10μs/DIV



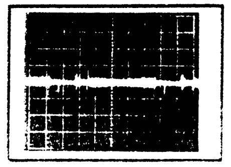
33. 1V/DIV, 20μs/DIV



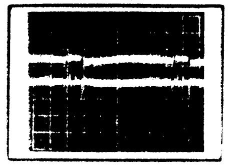
34. 50mV/DIV, 10μs/DIV



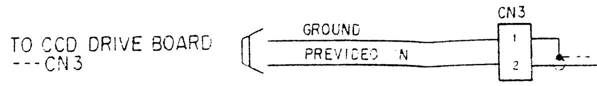
35. 50mV/DIV, 10μs/DIV



36. 0.2V/DIV, 10μs/DIV



CONDUCTOR VIEW OF PROCESS BOARD

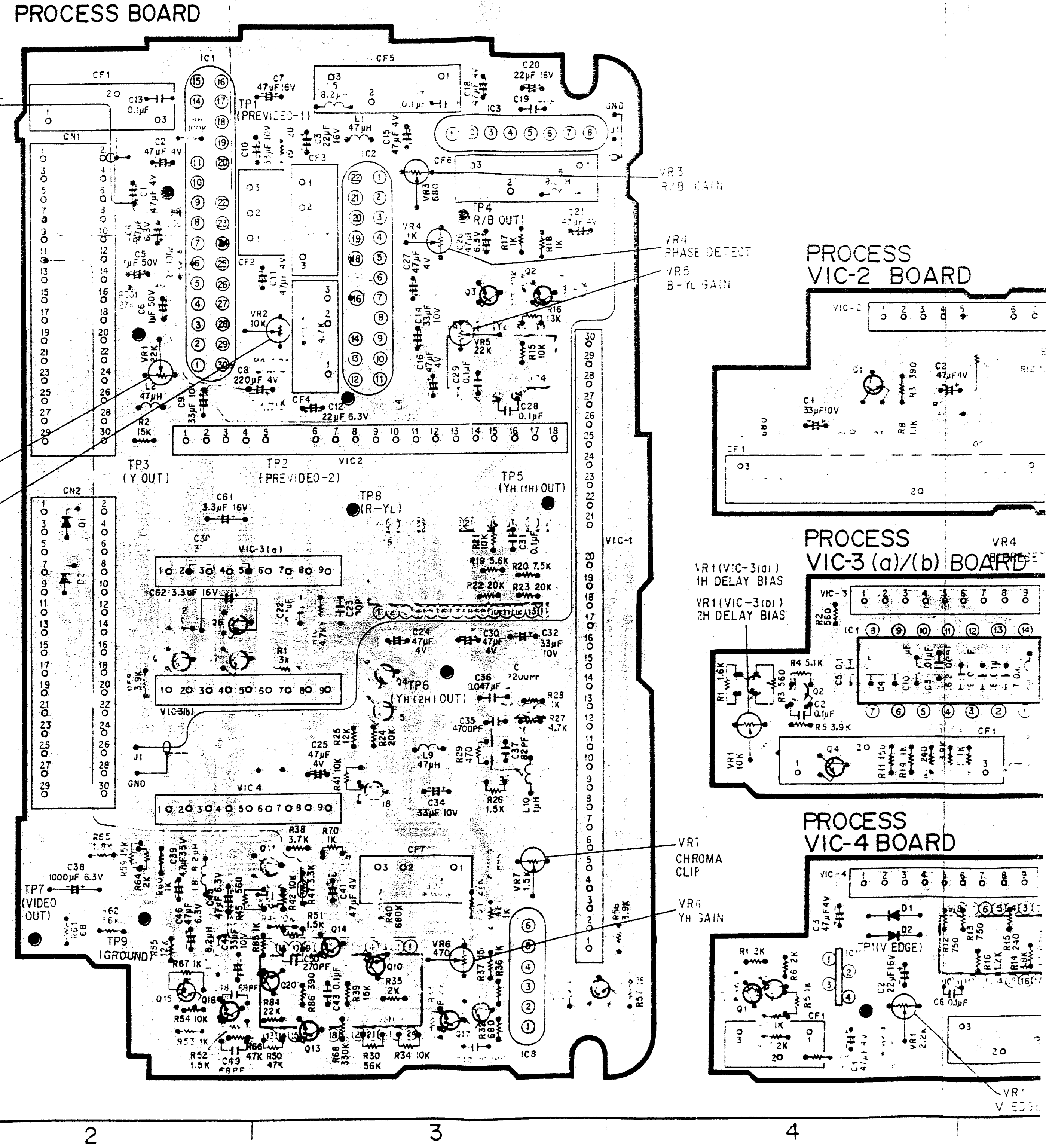

TO CCD DRIVE BOARD
---CN3
GROUND
PREVIDEO IN
CN3
1
2

CN1 (TO MOTHER BOARD----CN3)

1	GROUND	2	PREVIDEO OUT
3	-1.8V IN	4	SENSE UP CONT IN
5	-6 IN	6	NOT USED
7	YH OUT	8	LOW LIGHT INFO OUT
9	-8.6V IN	10	CP3/W.HD/W.BL IN
11	TEMP INFO IN	12	ALC DET OUT
13	MAN R GAIN CONT IN	14	AGC CONT OUT
15	W. BL (NEGATIVE) IN	16	GAIN CONT IN
17	SC 1 OUT	18	-4.9V IN
19	SC2 OUT	20	RSC IN
21	SC2 IN	22	1/2 fH IN
23	CP 2 IN	24	MAN B. GAIN CONT IN
25	AWC R OUT	26	B VR IN
27	YH OUT	28	AWC B CONT IN
29	R-Y OUT	30	R VR IN

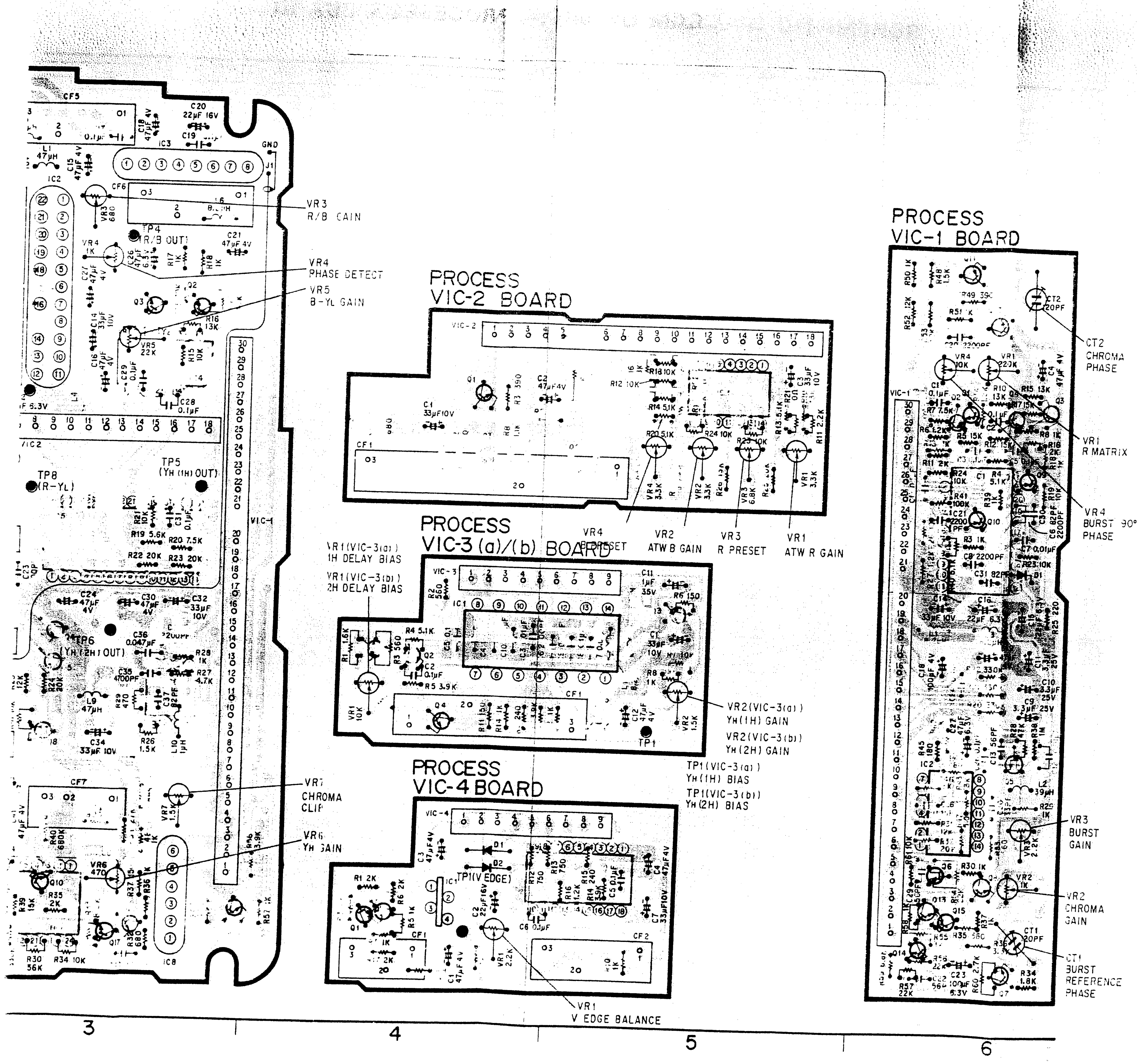
CN 2 (TO MOTHER BOARD----CN 2)

1	B-Y OUT	2	AWC R CONT IN
3	PLAYBACK-II IN	4	AWC Y OUT
5	PLAYBACK-I IN	6	AWC B OUT
7	GROUND (VIDEO)	8	B DC CONT OUT
9	VIDEO IN/OUT: COLOR BAR IN	10	R DC CONT OUT
11	VIDEO OUT	12	ATW R IN
13	CHARACTER IN	14	ATW B IN
15	CP2/W. HD/C. BL IN	16	CP 5 IN
17	PEDESTAL CONT IN	18	GROUND
19	W. HD IN	20	SC 1 IN
21	EXT SC IN	22	GROUND
23	COLOR CORRECT IN	24	TEMP INFO OUT
25	EXT CHARACTER IN	26	BFP IN
27	NEG/POS CONT IN	28	APP OUT
29	FADE CONT IN	30	SYNC IN

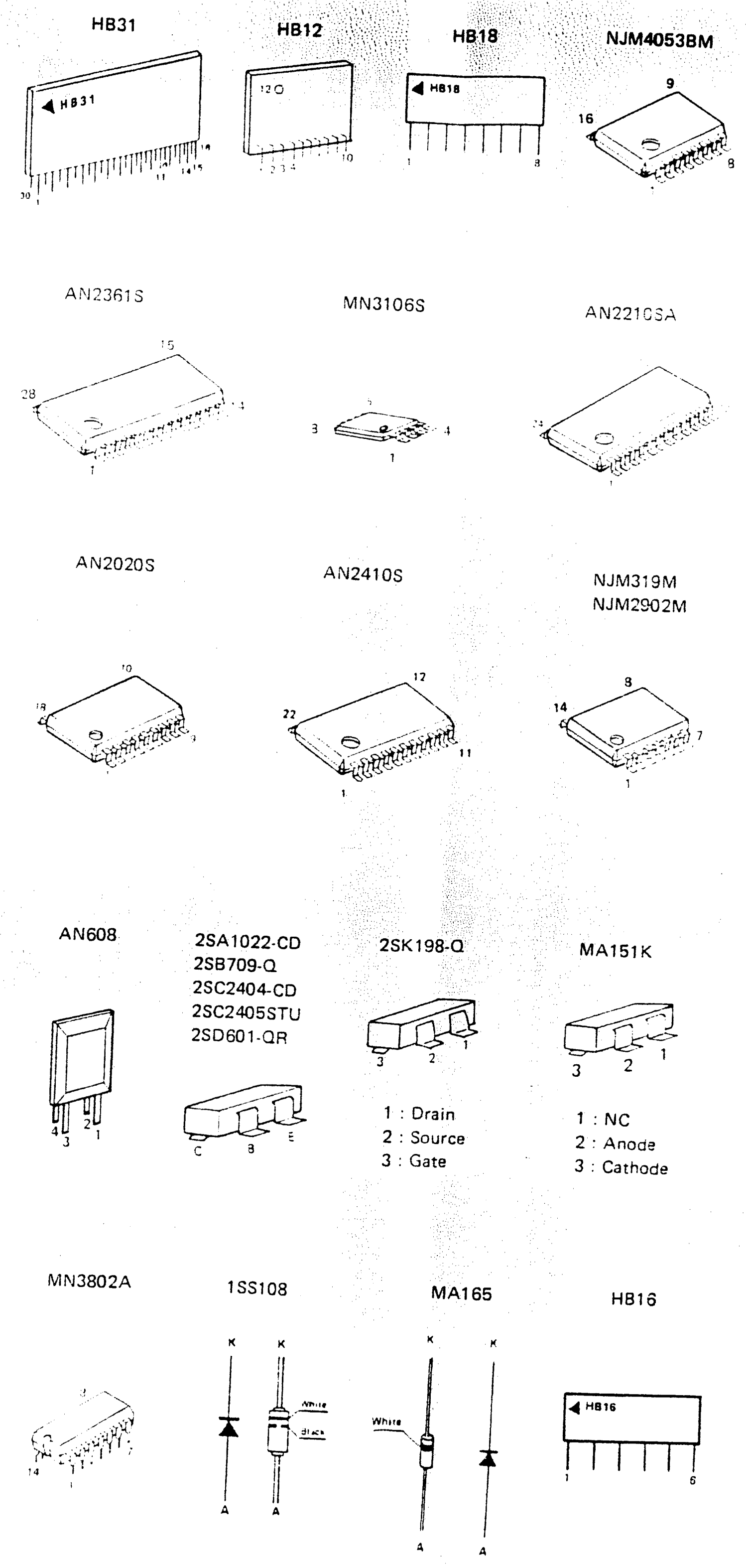

PROCESS BOARD
VR1
AGC GAIN
VR2
PEDESTAL
C
B
A
1
2
3
4
CN1
CN2
CF1
CF2
CF3
CF4
CF5
CF6
CF7
IC1
IC2
IC3
IC8
TP1 (PREVIDEO-1)
TP2 (PREVIDEO-2)
TP3 (Y OUT)
TP4 R/B OUT)
TP5 (YH (1H) OUT)
TP6 YH (2H) OUT)
TP7 (VIDEO OUT)
TP8 (R-YL)
TP9 (GROUND)
VIC-3(a)
VIC-3(b)
VIC 4
VIC2
VIC-1
J1
GND
VR3
R/B GAIN
VR4
PHASE DETECT
VR5
B-YL GAIN
VR7
CHROMA CLIP
VR6
YH GAIN
PROCESS VIC-2 BOARD
PROCESS VIC-3 (a)/(b) BOARD
VR1 (VIC-3(a))
1H DELAY BIAS
VR1 (VIC-3(b))
2H DELAY BIAS
PROCESS VIC-4 BOARD
TP1 (V EDGE)
VR1
V EDGE

●—w—● COMPONENT SIDE
●-w-● PATTERN SIDE

JCTOR VIEW OF PROCESS BOARD



VR3 R/B GAIN
TP4 (R/B OUT)
VR4 PHASE DETECT
VR5 B-YL GAIN
TP8 (R-YL)
TP5 (YH (1H) OUT)
TP6 (YH (2H) OUT)
VR7 CHROMA CLIP
VR6 YH GAIN
PROCESS VIC-2 BOARD
VR4 B PRESET
VR2 ATW B GAIN
VR3 R PRESET
VR1 ATW R GAIN
PROCESS VIC-3 (a)/(b) BOARD
VR1(VIC-3(a)) 1H DELAY BIAS
VR1(VIC-3(b)) 2H DELAY BIAS
VR2(VIC-3(a)) YH(1H) GAIN
VR2(VIC-3(b)) YH(2H) GAIN
TP1(VIC-3(a)) YH(1H) BIAS
TP1(VIC-3(b)) YH(2H) BIAS
PROCESS VIC-4 BOARD
TP1(V EDGE)
VR1 V EDGE BALANCE
PROCESS VIC-1 BOARD
CT2 CHROMA PHASE
VR1 R MATRIX
VR4 BURST 90° PHASE
VR3 BURST GAIN
VR2 CHROMA GAIN
CT1 BURST REFERENCE PHASE
3
4
5
6



HB31
HB12
HB18
NJM4053BM
AN2361S
MN3106S
AN2210SA
AN2020S
AN2410S
NJM319M
NJM2902M
AN608
2SA1022-CD
2SB709-Q
2SC2404-CD
2SC2405STU
2SD601-QR
C B E
2SK198-Q
1 : Drain
2 : Source
3 : Gate
MA151K
1 : NC
2 : Anode
3 : Cathode
MN3802A
1SS108
MA165
HB16
K
A
White
Black

PROCESS BOARD

IC1	HB31		C2
IC2	HB12		C3
IC3	HB18		C3
IC4	NJM4053BM		C3
IC5	AN2361S		B3
IC6	MN3106S		B3
IC7	AN2210SA		A3
IC8	HB16		A3
Q1	2SB709-Q	[A]	B2
Q2	2SD601-QR	[Y]	C3
Q3	2SD601-QR	[Y]	C3
Q4	2SC2404-CD	[U]	B3
Q5	2SC2404-CD	[U]	B3
Q6	2SD601-QR	[Y]	B2
Q7	2SB709-Q	[A]	B2
Q8	2SK198-Q	[10]	A3
Q9	2SC2404-CD	[U]	A3
Q10	2SD601-QR	[Y]	A2
Q11	2SB709-Q	[A]	A3
Q12	2SD601-QR	[Y]	A3
Q13	2SD601-QR	[Y]	A2
Q14	2SB709-Q	[A]	A2
Q15	2SC2404-CD	[U]	A2
Q16	2SD601-QR	[Y]	A2
Q17	2SD601-QR	[Y]	A2
Q20	2SC2404-CD	[U]	A2
D1	MA151K	[MH]	B2
D2	MA151K	[MH]	B2
D301	MA165		C2

PROCESS VIC-1 BOARD

IC1	AN2410S		B6
IC2	NJM319M		A6
Q1	2SD601-QR	[Y]	B6
Q2	2SD601-QR	[Y]	B6
Q3	2SD601-QR	[Y]	C6
Q4	2SD601-QR	[Y]	C6
Q5	2SK198-Q	[10]	A6
Q6	2SK198-Q	[10]	A6
Q7	2SD601-QR	[Y]	A6
Q8	2SC2404-CD	[U]	A6
Q9	2SB709-Q	[A]	B6
Q10	2SB709-Q	[A]	B6
Q11	2SA1022-CD	[E]	C6
Q12	2SC2404-CD	[U]	C6
Q13	2SD601-QR	[Y]	A6
Q14	2SD601-QR	[Y]	A6
Q15	2SB709-Q	[A]	A6
D1	MA151K	[MH]	B6

PROCESS VIC-2 BOARD

IC1	NJM2902M		C5
Q1	2SC2405STU	[S]	C4
Q2	2SC2404-CD	[U]	C5
Q3	2SC2404-CD	[U]	C4

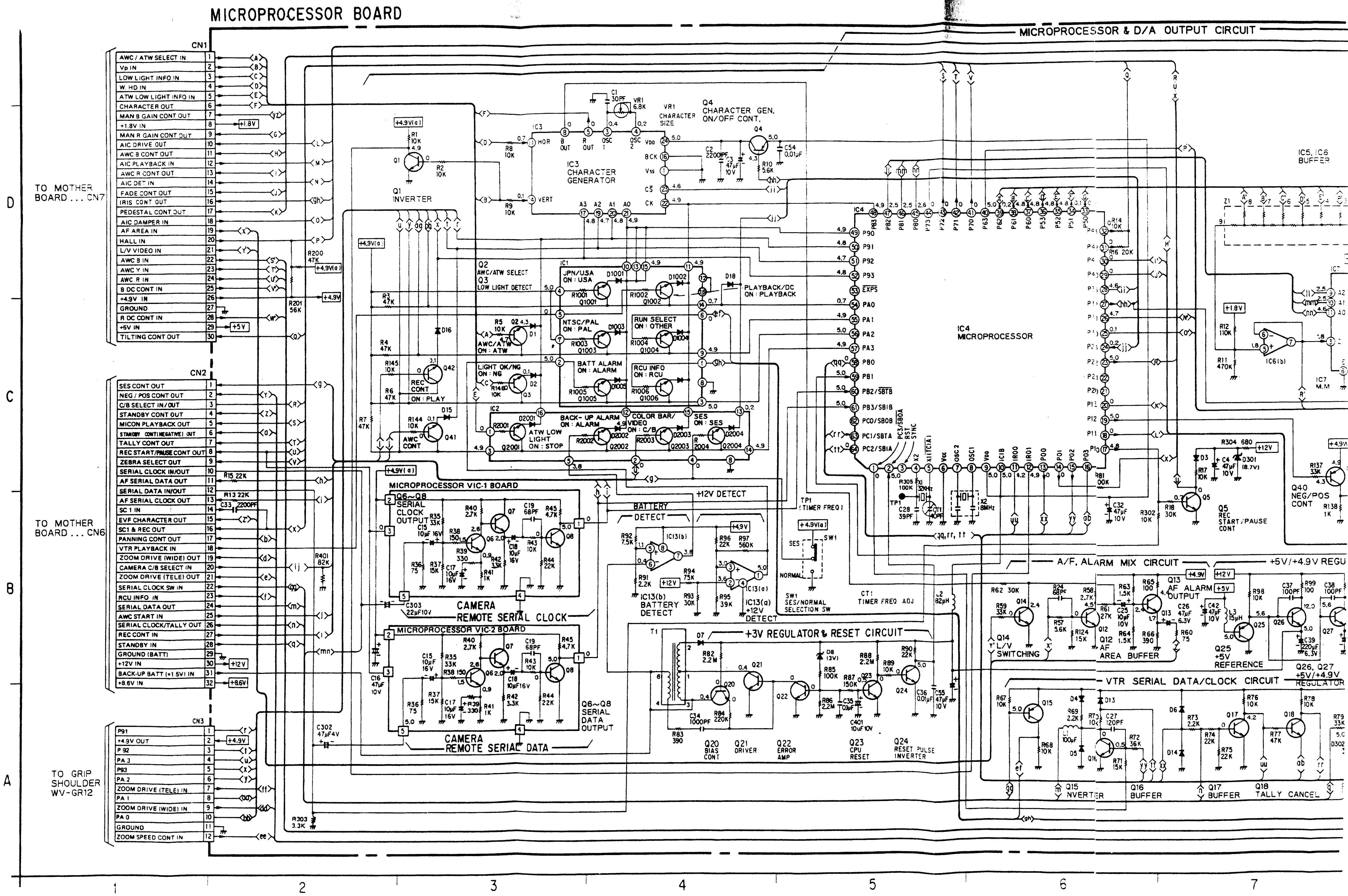
PROCESS VIC-3 (a)/(b) BOARD

IC1	MN3802A		B4, B5
Q1	2SB709-Q	[A]	B4
Q2	2SD601-QR	[Y]	B4
Q3	2SC2404-CD	[U]	B5
Q4	2SC2404-CD	[U]	B4
Q5	2SD601-QR	[Y]	B5

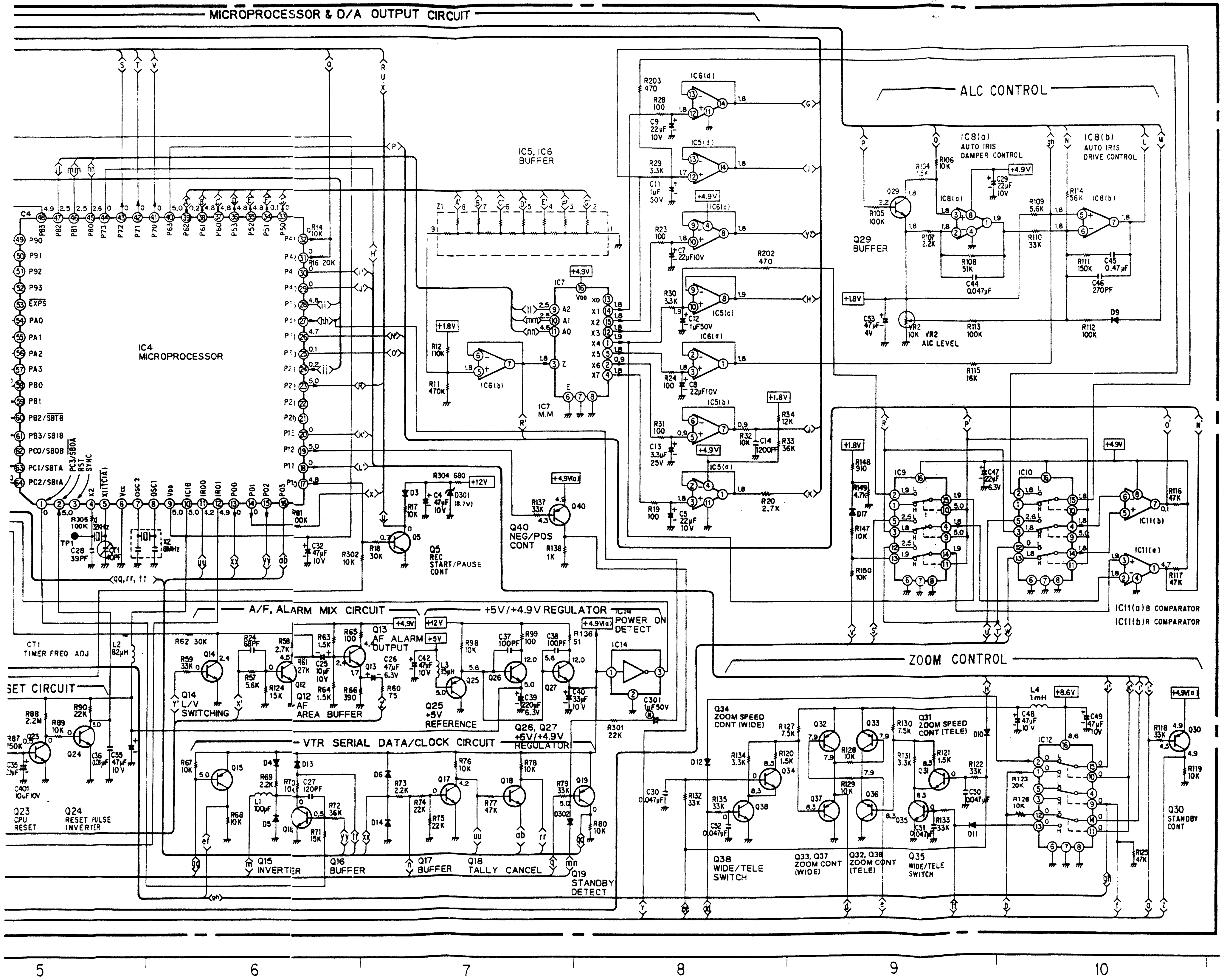
PROCESS VIC-4 BOARD

IC1	AN608		A4
IC2	AN2020S		A5
Q1	2SC2404-CD	[U]	A4
Q2	2SD601-QR	[Y]	A4
D1	1SS108		A4
D2	1SS108		A4

SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD


MICROPROCESSOR BOARD
MICROPROCESSOR & D/A OUTPUT CIRCUIT
TO MOTHER BOARD ... CN7
TO MOTHER BOARD ... CN6
TO GRIP SHOULDER WV-GR12
CN1
1 AWC / ATW SELECT IN
2 Vp IN
3 LOW LIGHT INFO IN
4 W. HD IN
5 ATW LOW LIGHT INFO IN
6 CHARACTER OUT
7 MAN B GAIN CONT OUT
8 +1.8V IN
9 MAN R GAIN CONT OUT
10 AIC DRIVE OUT
11 AWC B CONT OUT
12 AIC PLAYBACK IN
13 AWC R CONT OUT
14 AIC DET IN
15 FADE CONT OUT
16 IRIS CONT OUT
17 PEDESTAL CONT OUT
18 AIC DAMPER IN
19 AF AREA IN
20 HALL IN
21 L/V VIDEO IN
22 AWC B IN
23 AWC Y IN
24 AWC R IN
25 B DC CONT IN
26 +4.9V IN
27 GROUND
28 R DC CONT IN
29 +5V IN
30 TILTING CONT OUT
CN2
1 SES CONT OUT
2 NEG / POS CONT OUT
3 C/B SELECT IN/OUT
4 STANDBY CONT OUT
5 MICON PLAYBACK OUT
6 STANDBY CONT(NEGATIVE) OUT
7 TALLY CONT OUT
8 REC START/PAUSE CONT OUT
9 ZEBRA SELECT OUT
10 SERIAL CLOCK IN/OUT
11 AF SERIAL DATA OUT
12 SERIAL DATA IN/OUT
13 AF SERIAL CLOCK OUT
14 SC 1 IN
15 EVF CHARACTER OUT
16 SC1 & REC OUT
17 PANNING CONT OUT
18 VTR PLAYBACK IN
19 ZOOM DRIVE (WIDE) OUT
20 CAMERA C/B SELECT IN
21 ZOOM DRIVE (TELE) OUT
22 SERIAL CLOCK SW IN
23 RCU INFO IN
24 SERIAL DATA OUT
25 AWC START IN
26 SERIAL CLOCK/TALLY OUT
27 REC CONT IN
28 STANDBY IN
29 GROUND (BATT)
30 +12V IN
31 BACK-UP BATT (+1.5V) IN
32 +8.6V IN
CN3
1 P91
2 +4.9V OUT
3 P 92
4 PA 3
5 P93
6 PA 2
7 ZOOM DRIVE (TELE) IN
8 PA 1
9 ZOOM DRIVE (WIDE) IN
10 PA 0
11 GROUND
12 ZOOM SPEED CONT IN
Q1 INVERTER
IC3 CHARACTER GENERATOR
VR1 CHARACTER SIZE
Q4 CHARACTER GEN. ON/OFF CONT.
Q2 AWC/ATW SELECT
Q3 LOW LIGHT DETECT
IC1
JPN/USA ON : USA
NTSC/PAL ON : PAL
BATT ALARM ON : ALARM
LIGHT OK/NG ON : NG
AWC/ATW ON : ATW
RUN SELECT ON : OTHER
RCU INFO ON : RCU
PLAYBACK/DC ON : PLAYBACK
IC2
ATW LOW LIGHT ON : STOP
BACK- UP ALARM ON : ALARM
COLOR BAR/VIDEO ON : C/B
SES ON : SES
REC CONT ON : PLAY
AWC CONT
IC4 MICROPROCESSOR
MICROPROCESSOR VIC-1 BOARD
Q6~Q8 SERIAL CLOCK OUTPUT
CAMERA REMOTE SERIAL CLOCK
MICROPROCESSOR VIC-2 BOARD
Q6~Q8 SERIAL DATA OUTPUT
CAMERA REMOTE SERIAL DATA
+12V DETECT
BATTERY DETECT
IC13(b) BATTERY DETECT
IC13(a) +12V DETECT
TP1 TIMER FREQ
SW1 SES/NORMAL SELECTION SW
CT1 TIMER FREQ ADJ
+3V REGULATOR & RESET CIRCUIT
Q20 BIAS CONT
Q21 DRIVER
Q22 ERROR AMP
Q23 CPU RESET
Q24 RESET PULSE INVERTER
A/F, ALARM MIX CIRCUIT
Q14 L/V SWITCHING
Q13 AF ALARM OUTPUT
Q12 AF AREA BUFFER
+5V/+4.9V REGU
Q25 +5V REFERENCE
Q26, Q27 +5V/+4.9V REGULATOR
VTR SERIAL DATA/CLOCK CIRCUIT
Q15 INVERTER
Q16 BUFFER
Q17 BUFFER
Q18 TALLY CANCEL
Q5 REC START/PAUSE CONT
Q40 NEG/POS CONT
IC5, IC6 BUFFER
IC7 M.M
1 2 3 4 5 6 7
A B C D

OF MICROPROCESSOR BOARD


MICROPROCESSOR & D/A OUTPUT CIRCUIT
IC4 MICROPROCESSOR
IC5, IC6 BUFFER
IC7 M.M
ALC CONTROL
IC8(a) AUTO IRIS DAMPER CONTROL
IC8(b) AUTO IRIS DRIVE CONTROL
Q29 BUFFER
VR2 AlC LEVEL
IC11(a)8 COMPARATOR
IC11(b)R COMPARATOR
Q40 NEG/POS CONT
Q5 REC START/PAUSE CONT
CT1 TIMER FREQ ADJ
SET CIRCUIT
Q23 CPU RESET
Q24 RESET PULSE INVERTER
A/F, ALARM MIX CIRCUIT
Q14 L/V SWITCHING
Q12 AF AREA BUFFER
Q13 AF ALARM OUTPUT
+5V/+4.9V REGULATOR
Q25 +5V REFERENCE
Q26, Q27 +5V/+4.9V REGULATOR
IC14 POWER ON DETECT
VTR SERIAL DATA/CLOCK CIRCUIT
Q15 INVERTER
Q16 BUFFER
Q17 BUFFER
Q18 TALLY CANCEL
Q19 STANDBY DETECT
ZOOM CONTROL
Q34 ZOOM SPEED CONT (WIDE)
Q31 ZOOM SPEED CONT (TELE)
Q38 WIDE/TELE SWITCH
Q33, Q37 ZOOM CONT (WIDE)
Q32, Q36 ZOOM CONT (TELE)
Q35 WIDE/TELE SWITCH
Q30 STANDBY CONT
5
6
7
8
9
10

MICROPROCESSOR BOARD

IC1	AN90B82S		C4
IC2	AN90B82S		C3, C4
IC3	M50450FP		D3, D4
IC4	MN1754CVS2		C5, C6
IC5	M5224FP		C8, D8
IC6	M5224FP		C7, D8
IC7	MN4051BS		C7, C8
IC8	NJM3414M		D9, D10
IC9	MN4053BS		B9
IC10	MN4053BS		B10
IC11	AN6914S		B10, C10
IC12	MN4053BS		A10
IC13	M5223FP		B4
IC14	M51951AMLW		B8
Q1	2SD601-QR	[Y]	D3
Q2	2SD601-QR	[Y]	C3
Q3	2SD601-QR	[Y]	C3
Q4	2SB709-Q	[A]	D4
Q5	2SD601-QR	[Y]	B7
Q12	2SC2404-CD	[U]	B6
Q13	2SD601-QR	[Y]	B6
Q14	2SD601-QR	[Y]	B6
Q15	2SB709-Q	[A]	A6
Q16	2SD601-QR	[Y]	A6
Q17	2SD601-QR	[Y]	A7
Q18	2SD601-QR	[Y]	A7
Q19	2SB709-Q	[A]	A8
Q20	2SD1030-T	[1Z]	A4
Q21	2SD1030-T	[1Z]	A4
Q22	2SC2404-CD	[U]	A5
Q23	2SD1030-T	[1Z]	A5
Q24	2SD1030-T	[1Z]	B5
Q25	2SB709-Q	[A]	B7
Q26	2SD601-QR	[Y]	B7
Q27	2SD601-QR	[Y]	B7
Q29	2SD1030-T	[1Z]	D9
Q30	2SB709-Q	[A]	B10
Q31	2SD601-QR	[Y]	A9
Q32	2SB709-Q	[A]	A9
Q33	2SB709-Q	[A]	A9
Q34	2SD601-QR	[Y]	A8
Q35	2SD601-QR	[Y]	A9
Q36	2SB709-Q	[A]	A9
Q37	2SB709-Q	[A]	A9
Q38	2SD601-QR	[Y]	A8
Q40	2SB709-Q	[A]	C7
Q41	2SD601-QR	[Y]	C3
Q42	2SD601-QR	[Y]	C3
D1	MA151K	[MH]	C3
D2	MA151K	[MH]	C3
D3	MA151K	[MH]	C7
D4	MA151K	[MH]	A6
D5	MA165		A6
D6	MA151K	[MH]	A7
D7	MA151K	[MH]	B4
D8	HZ3BLL		B5
D9	MA151K	[MH]	C10
D10	MA151K	[MH]	B9
D11	MA151K	[MH]	A9
D12	MA151K	[MH]	A8
D13	MA151K	[MH]	A6
D14	MA151K	[MH]	A7
D15	MA151K	[MH]	C3
D16	MA151K	[MH]	C3
D17	MA151K	[MH]	C9
D18	MA151K	[MH]	C4
D301	HZ9LB-2		C7
D302	MA165		A7

MICROPROCESSOR VIC-1 BOARD

Q6	2SD601-QR	[Y]	B3
Q7	2SD601-QR	[Y]	B3
Q8	2SD601-QR	[Y]	B3

MICROPROCESSOR VIC-2 BOARD

Q6	2SD601-QR	[Y]	B3
Q7	2SD601-QR	[Y]	B3
Q8	2SD601-QR	[Y]	B3

MICROPROCESSOR BOARD

IC1	AN90B82S		B3
IC2	AN90B82S		B3
IC3	M50450FP		C3
IC4	MN1754CVS2		B2
IC5	M5224FP		C2
IC6	M5224FP		C2
IC7	MN4051BS		C2
IC8	NJM3414M		B2
IC9	MN4053BS		B2
IC10	MN4053BS		B2
IC11	AN6914S		B2
IC12	MN4053BS		A3
IC13	M5223FP		A2
IC14	M51951AMLW		A2
Q1	2SD601-QR	[Y]	C2
Q2	2SD601-QR	[Y]	C3
Q3	2SD601-QR	[Y]	C3
Q4	2SB709-Q	[A]	C3
Q5	2SD601-QR	[Y]	B2
Q12	2SC2404-CD	[U]	B2
Q13	2SD601-QR	[Y]	B2
Q14	2SD601-QR	[Y]	B2
Q15	2SB709-Q	[A]	B3
Q16	2SD601-QR	[Y]	A2
Q17	2SD601-QR	[Y]	A2
Q18	2SD601-QR	[Y]	B2
Q19	2SB709-Q	[A]	A2
Q20	2SD1030-T	[1Z]	A2
Q21	2SD1030-T	[1Z]	A2
Q22	2SC2404-CD	[U]	A2
Q23	2SD1030-T	[1Z]	A2
Q24	2SD1030-T	[1Z]	A2
Q25	2SB709-Q	[A]	A2
Q26	2SD601-QR	[Y]	A2
Q27	2SD601-QR	[Y]	A2
Q29	2SD1030-T	[1Z]	C2
Q30	2SB709-Q	[A]	B2
Q31	2SD601-QR	[Y]	A3
Q32	2SB709-Q	[A]	A2
Q33	2SB709-Q	[A]	A2
Q34	2SD601-QR	[Y]	A3
Q35	2SD601-QR	[Y]	A3
Q36	2SB709-Q	[A]	A3
Q37	2SB709-Q	[A]	A3
Q38	2SD601-QR	[Y]	A3
Q40	2SB709-Q	[A]	B2
Q41	2SD601-QR	[Y]	A3
Q42	2SD601-QR	[Y]	A3
D1	MA151K	[MH]	C3
D2	MA151K	[MH]	C3
D3	MA151K	[MH]	B2
D4	MA151K	[MH]	A2
D5	MA165		A2
D6	MA151K	[MH]	A2
D7	MA151K	[MH]	A2
D8	HZ3BLL		A2
D9	MA151K	[MH]	B2
D10	MA151K	[MH]	A3
D11	MA151K	[MH]	A3
D12	MA151K	[MH]	A3
D13	MA151K	[MH]	A2
D14	MA151K	[MH]	A2
D15	MA151K	[MH]	A3
D16	MA151K	[MH]	A3
D17	MA151K	[MH]	B2
D18	MA151K	[MH]	B3
D301	HZ9LB-2		A2
D302	MA165		A2

MICROPROCESSOR VIC-1/VIC-2 BOARD

Q6	2SD601-QR	[Y]	B3
Q7	2SD601-QR	[Y]	B3
Q8	2SD601-QR	[Y]	B3

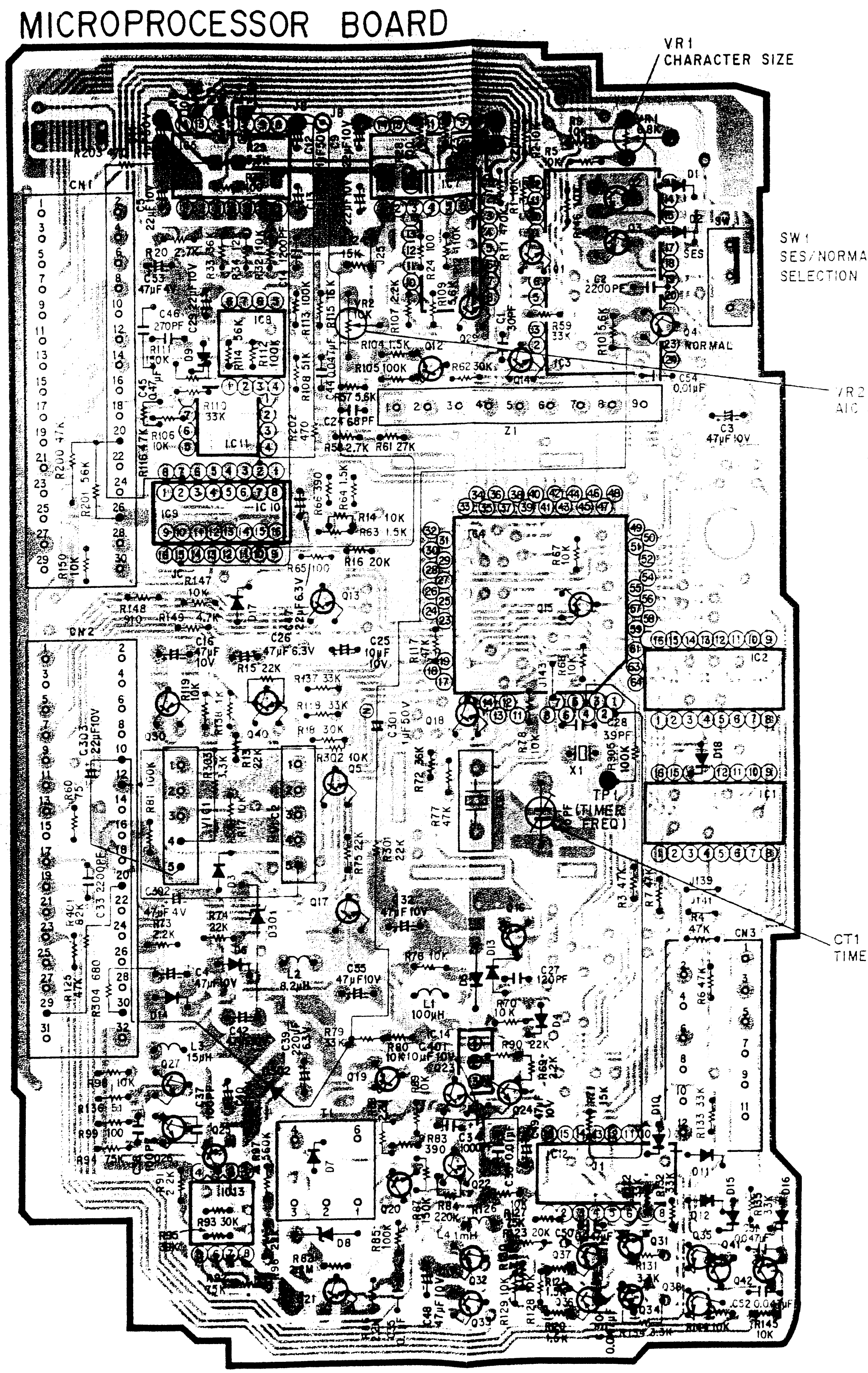
CONDUCTOR VIEW OF MICROPROCESSOR BOARD

CN1 (TO MOTHER BOARD---CN7)

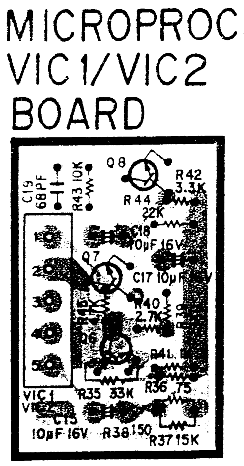
1	AWC / ATW SELECT IN	2	Vp IN
3	LOW LIGHT INFO IN	4	W. HD IN
5	ATW LOW LIGHT INFO IN	6	CHARACTER OUT
7	MAN B GAIN CONT OUT	8	+1.8V IN
9	MAN R GAIN CONT OUT	10	AIC DRIVE OUT
11	AWC B CONT OUT	12	AIC PLAYBACK IN
13	AWC R CONT OUT	14	AIC DET IN
15	FADE CONT OUT	16	IRIS CONT OUT
17	PEDESTAL CONT OUT	18	AIC DAMPER IN
19	AF AREA IN	20	HALL IN
21	L/V VIDEO IN	22	AWC B IN
23	AWC Y IN	24	AWC R IN
25	B DC CONT IN	26	+4.9V IN
27	GROUND	28	R DC CONT IN
29	+5V IN	30	TILTING CONT OUT

CN 2 (TO MOTHER BOARD---CN6)

1	SES CONT OUT	2	NEG / POS CONT OUT
3	C/B SELECT IN/OUT	4	STANDBY CONT OUT
5	MICON PLAYBACK OUT	6	STANDBY CONT(NEGATIVE) OUT
7	TALLY CONT OUT	8	REC START/PAUSE CONT OUT
9	ZEBRA SELECT OUT	10	SERIAL CLOCK IN/OUT
11	AF SERIAL DATA OUT	12	SERIAL DATA IN/OUT
13	AF SERIAL CLOCK OUT	14	SC 1 IN
15	EVF CHARACTER OUT	16	SC1 & REC OUT
17	PANNING CONT OUT	18	VTR PLAYBACK IN
19	ZOOM DRIVE (WIDE) OUT	20	CAMERA C/B SELECT IN
21	ZOOM DRIVE (TELE) OUT	22	SERIAL CLOCK SW IN
23	RCU INFO IN	24	SERIAL DATA OUT
25	AWC START IN	26	SERIAL CLOCK/TALLY OUT
27	REC CONT IN	28	STANDBY IN
29	GROUND (BATT)	30	+12V IN
31	BACK-UP BATT (+1.5V) IN	32	+8.6V IN


MICROPROCESSOR BOARD

COMPONENT SIDE
PATTERN SIDE


MICROPROCE
VIC1/VIC2
BOARD

CN3

1	P91
2	+4.9V OUT
3	P 92
4	PA 3
5	P93
6	PA 2
7	ZOOM DRIVE (TELE) IN
8	PA 1
9	ZOOM DRIVE (WIDE) IN
10	PA 0
11	GROUND
12	ZOOM SPEED CONT IN

TO GRIP SHOULDER
WV-GR12

CONDUCTOR VIEW OF MICROPROCESSOR BOARD

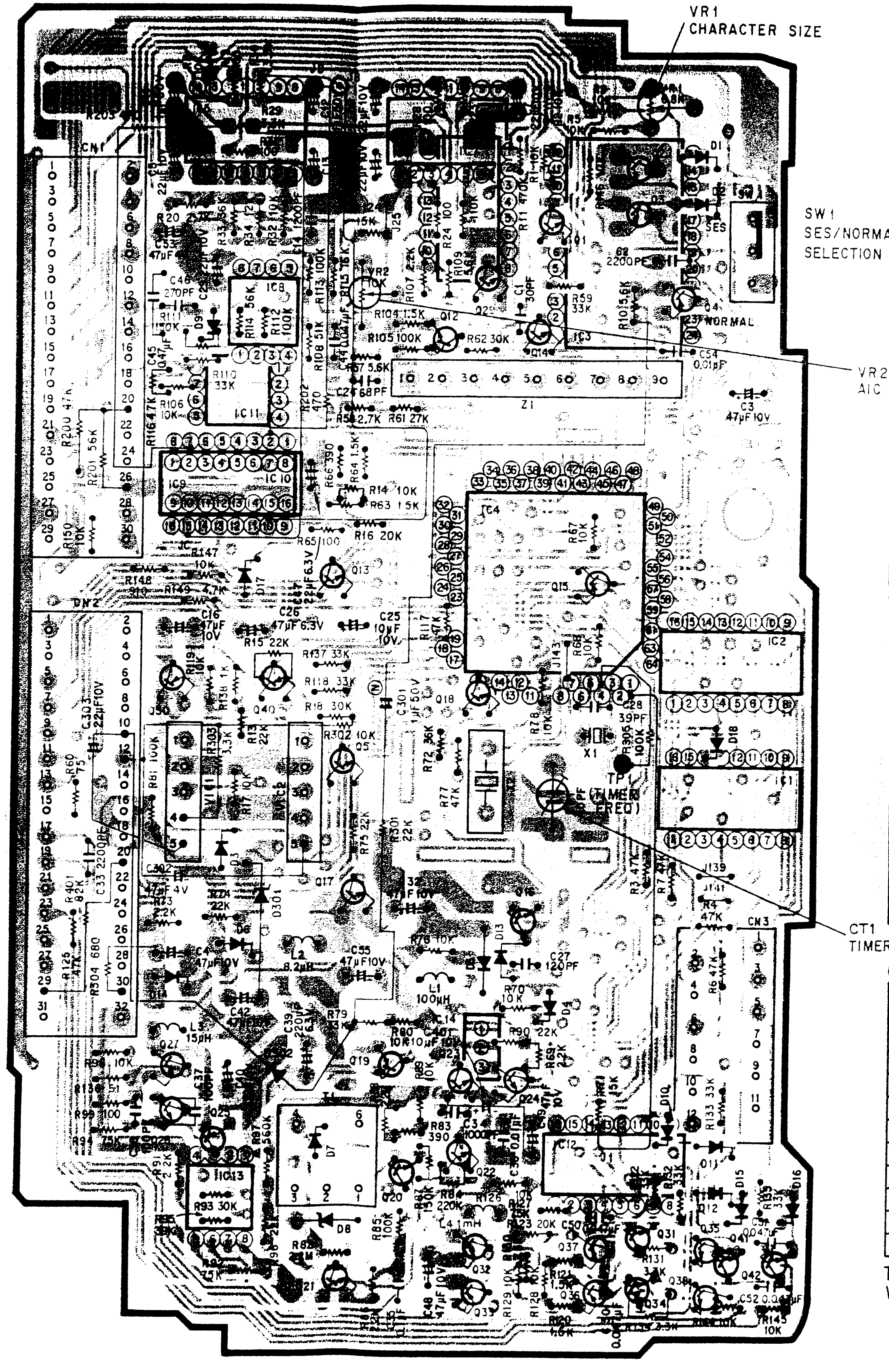
MICROPROCESSOR BOARD

N7)

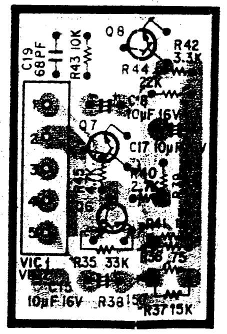
Vp IN
W. HD IN
CHARACTER OUT
+1.8V IN
AIC DRIVE OUT
AIC PLAYBACK IN
AIC DET IN
IRIS CONT OUT
AIC DAMPER IN
HALL IN
AWC B IN
AWC R IN
+4.9V IN
R DC CONT IN
TILTING CONT OUT

CN6)

NEG / POS CONT OUT
STANDBY CONT OUT
STANDBY CONT(NEGATIVE) OUT
REC START/PAUSE CONT OUT
SERIAL CLOCK IN/OUT
SERIAL DATA IN/OUT
SC 1 IN
SC1 & REC OUT
VTR PLAYBACK IN
CAMERA C/B SELECT IN
SERIAL CLOCK SW IN
SERIAL DATA OUT
SERIAL CLOCK/TALLY OUT
STANDBY IN
+12V IN
+8.6V IN


VR1
CHARACTER SIZE
SW1
SES/NORMAL
SELECTION SW
VR2
AIC LEVEL
CT1
TIMER FREQ ADJ
CN1
CN2
CN3
IC1
IC2
IC3
IC4
IC8
IC9
IC10
IC11
IC12
IC13
Z1
X1
TP1 (TIMER FREQ)
SES
NORMAL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32

MICROPROCESSOR VIC1/VIC2 BOARD


Q8
R42 3.3K
R44 22K
C19 68PF
R43 10K
Q7
C17 10μF
R35 33K
R38 15
R37 15K
VIC1
10μF 16V

CN3

1	P91
2	+4.9V OUT
3	P 92
4	PA 3
5	P93
6	PA 2
7	ZOOM DRIVE (TELE) IN
8	PA 1
9	ZOOM DRIVE (WIDE) IN
10	PA 0
11	GROUND
12	ZOOM SPEED CONT IN

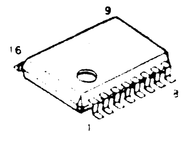
TO GRIP SHOULDER
WV−GR12

SIDE

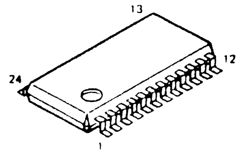
2 3

MICROPROCESSOR BOARD

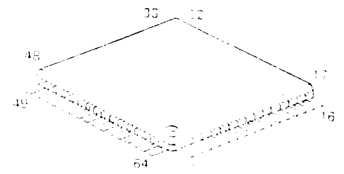
AN90B82S
MN4051BS
MN4053BS



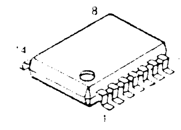
M50450FP



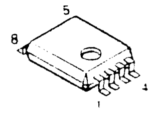
MN1754CVS2


33
32
48
17
16
64
1

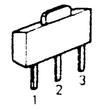
M5224FP



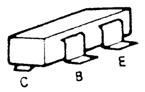
NJM3414M
AN6914S
M5223FP



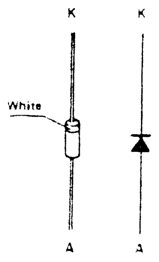
M51951AMLW



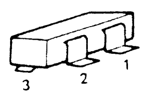
2SB709-Q
2SC2404-CD
2SD601-QR
2SD1030-T



MA165

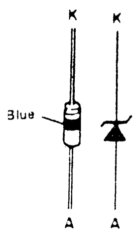


MA151K



1 : NC
2 : Anode
3 : Cathode

HZ3BLL
HZ9LB-2



POWER/SYNC BOARD

IC1	MN74HC00S		C3
IC2	MN6761S		C3
IC3	MN67602PS		C2, C3
IC4	HB40		A2
IC5	MN74HC74S		B3
IC6	NJM319M		B3
IC7	MN74HC00S		B3
IC8	NJM2048MC		A3
IC9	M5218FP		B3
IC10	NJM3414M		B3
Q4	2SB709-Q	[A]	B2
Q5	2SB709-Q	[A]	B2
Q6	2SB709-Q	[A]	B2
Q7	2SD601-QR	[Y]	A2
Q8	2SD601-QR	[Y]	B3
Q9	2SC2404-CD	[U]	B3
Q10	2SD602-QRS	[W]	B3
Q11	2SC3303-0Y		B3
Q12	2SB837-CD		A2
Q13	2SB837-CD		A2
Q14	2SD601-QR	[Y]	A3
Q15	2SB970-QRS	[1R]	B3
Q16	2SD1266		B3
Q17	2SB710-Q	[C]	B3
Q18	2SC2404-CD	[U]	C2
Q19	2SC2404-CD	[U]	C2
Q20	2SC2404-CD	[U]	B3
Q200	2SC1047-D		A2
D5	1SV153		C3
D8	MA151K	[MH]	B3
D9	MA151K	[MH]	B3
D10	MA170		B2
D11	EU01A		B3
D12	EU01A		A3
D13	RD9.1EB3		B2
D14	RD18EB3		B3
D15	EK14		A2
D16	EK14		A2
D17	MA151K	[MH]	B3

POWER/SYNC VIC-1 BOARD

Q1	2SK198-Q	[1O]	B4
D1	1SV153		B4
D2	1SV153		B4

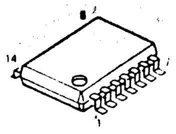
POWER/SYNC VIC-2 BOARD

Q2	2SK198-Q	[1O]	B4
D3	1SV153		B4
D4	1SV153		B4

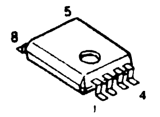
POWER/SYNC VIC-3 BOARD

Q1	2SK198-Q	[1O]	A4
D1	1SV153		A4
D2	1SV153		A4

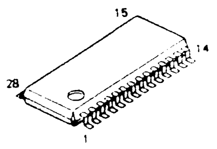
MN74HC00S
MN74HC74S
NJM2048MC



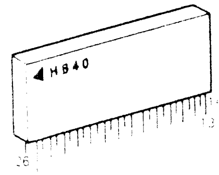
NJM319M
NJM3414M
M5218FP



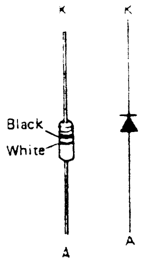
MN6761S
MN67602PS



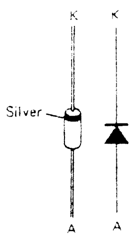
HB40



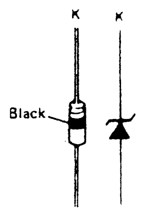
MA170



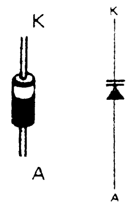
EU01A



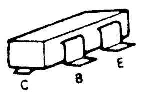
RD9. 1EB3
RD18EB3



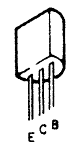
EK14



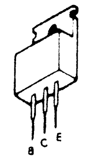
2SB709-Q
2SB710-Q
2SB970-QRS
2SC2404-CD
2SD601-QR
2SD602-QRS



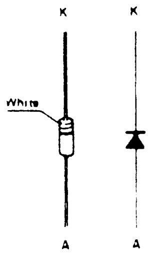
2SB837-CD
2SC1047-D
2SC3303-0Y



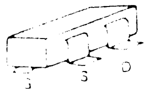
2SD1266



1SV153



2SK198-Q



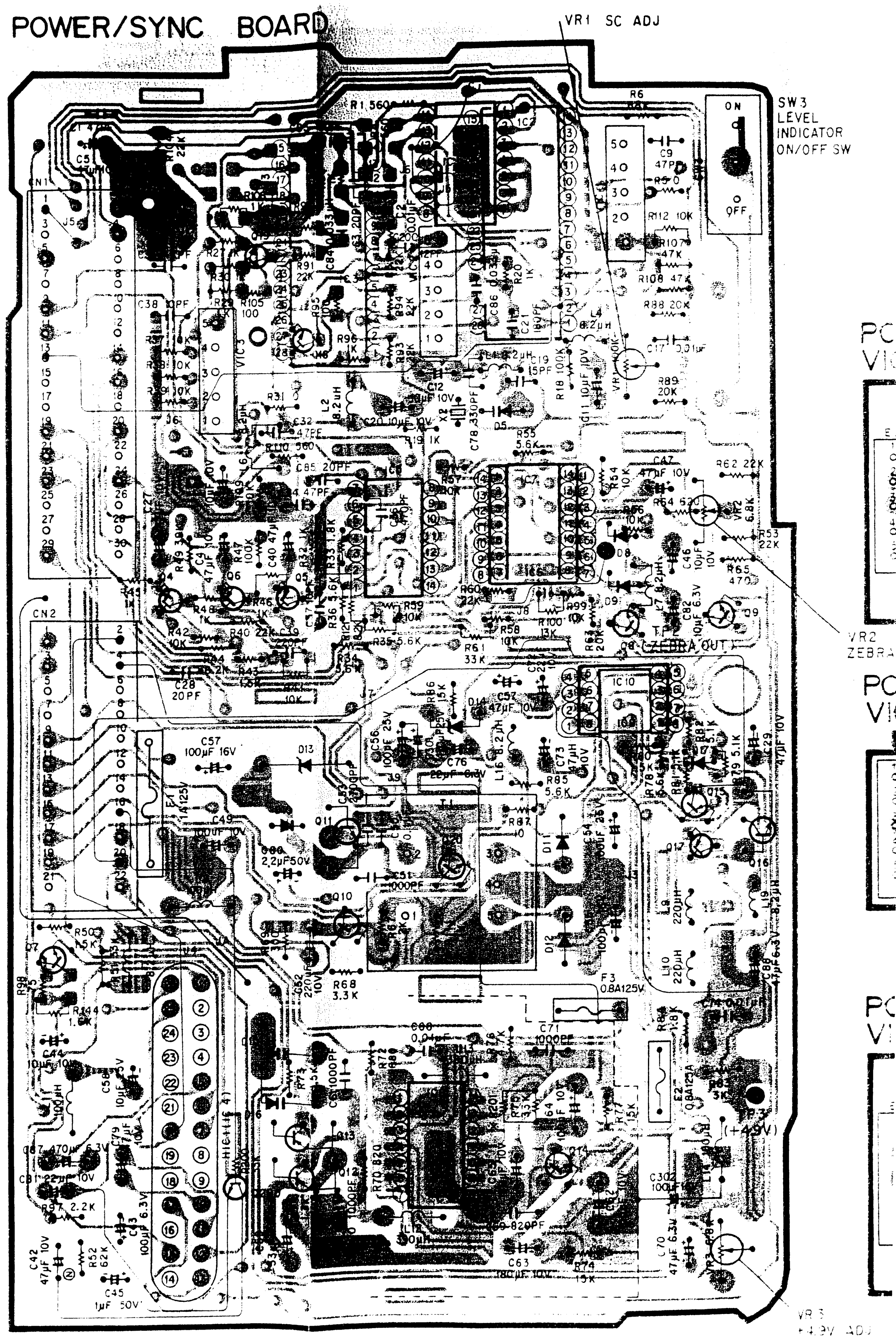
CONDUCTOR VIEW OF POWER/SYNC BOARD

CN1 (TO MOTHER BOARD---- CN13)

1	G/L SYNC IN	2	GROUND
3	BURST GATE PULSE OUT	4	G/L BSC IN
5	H. PHASE CONT IN	6	H. RESET PULSE IN
7	SC90° SW1 IN	8	BFP OUT
9	SC 2 OUT	10	SYNC OUT
11	SC 1 OUT	12	CP 2 / W. HD/C. BL OUT
13	SC 90° SW2 IN	14	BLK OUT
15	EXT / INT SELECT OUT	16	W. HD OUT
17	Y H IN	18	V p OUT
19	FADE CONT IN	20	ZEBRA SELECT IN
21	ZEBRA / Vp OUT	22	CP 3 OUT
23	ALC PLAYBACK OUT	24	W. BL (NEGATIVE) OUT
25	MICON PLAYBACK IN	26	CP 3 IN
27	VTR PLAYBACK OUT	28	CP 2 OUT
29	NEG / POS CONT IN	30	CP3/W.HD /W.BL OUT

CN 2 (TO MOTHER BOARD----CN12)

1	VIDEO IN	2	GROUND (VIDEO)
3	EVF VIDEO OUT	4	GROUND
5	C/B SELECT IN / OUT	6	GROUND
7	L/V VIDEO IN	8	+12V OUT
9	+16V OUT	10	+12V IN
11	–8V OUT	12	PLAYBACK-II OUT
13	+5V OUT	14	PLAYBACK-I OUT
15	+8.6V (AF) OUT	16	L/V VIDEO OUT
17	+6V OUT	18	STANDBY CONT IN
19	+1.8V OUT	20	+8.6V OUT
21	VIDEO OUT/COLOR BAR IN	22	+4.9V OUT



▨ —ww— COMPONENT SIDE
—ww— PATTERN SIDE

CONDUCTOR VIEW OF POWER/SYNC BOARD

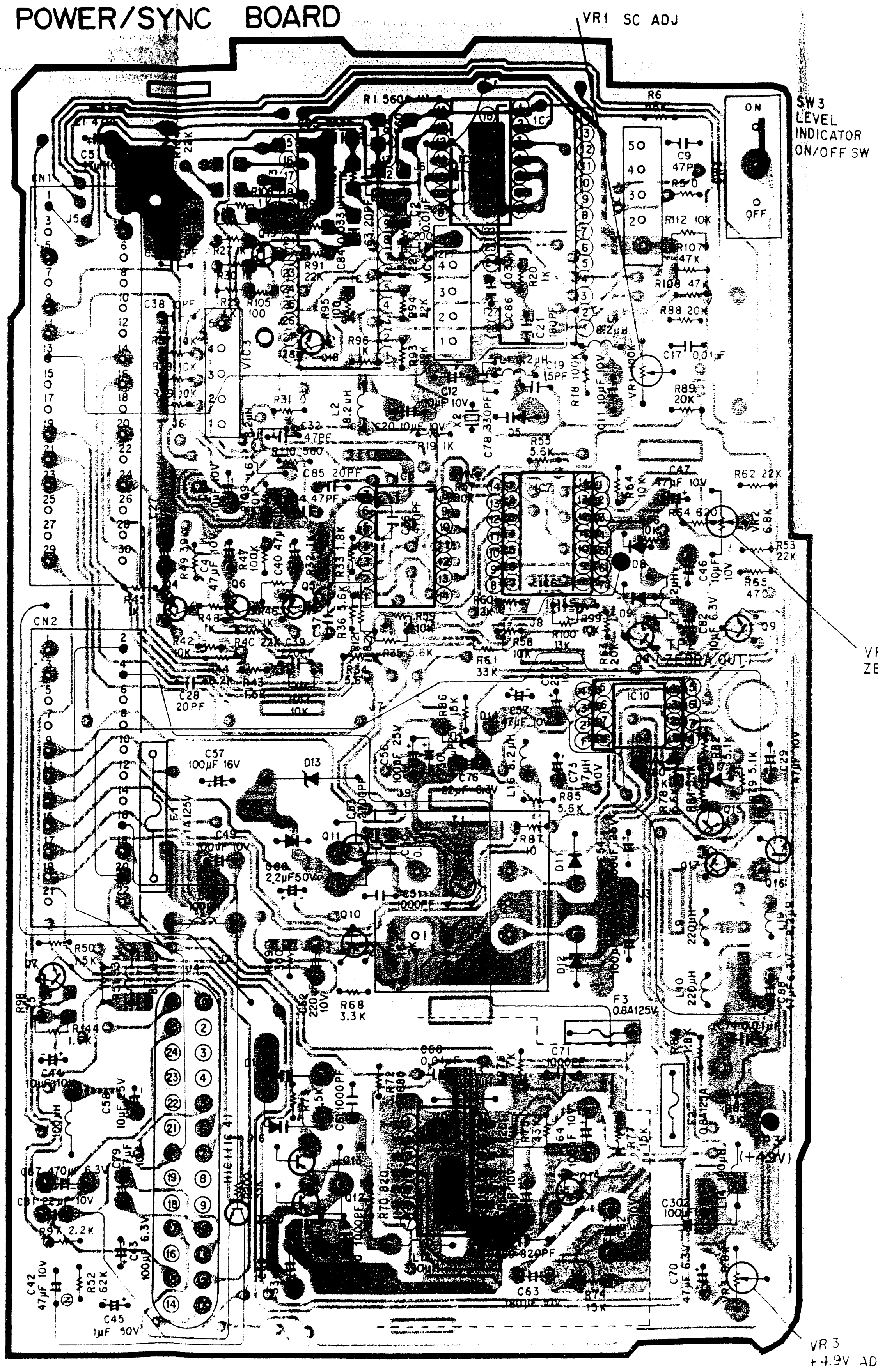
THER BOARD---- CN13)

	2	GROUND
PULSE OUT	4	G/L BSC IN
NT IN	6	H. RESET PULSE IN
	8	BFP OUT
	10	SYNC OUT
	12	CP 2 / W. HD/C. BL OUT
N	14	BLK OUT
LECT OUT	16	W. HD OUT
	18	V D OUT
IN	20	ZEBRA SELECT IN
OUT	22	CP 3 OUT
ACK OUT	24	W. BL (NEGATIVE) OUT
YBACK IN	26	CP 3 IN
ACK OUT	28	CP 2 OUT
ONT IN	30	CP3/W.HD /W.BL OUT

OTHER BOARD----CN12)

	2	GROUND (VIDEO)
OUT	4	GROUND
IN/OUT	6	GROUND
IN	8	+12V OUT
	10	+12V IN
	12	PLAYBACK-II OUT
	14	PLAYBACK-I OUT
OUT	16	L/V VIDEO OUT
	18	STANDBY CONT IN
	20	+8.6V OUT
/COLOR BAR IN	22	+4.9V OUT

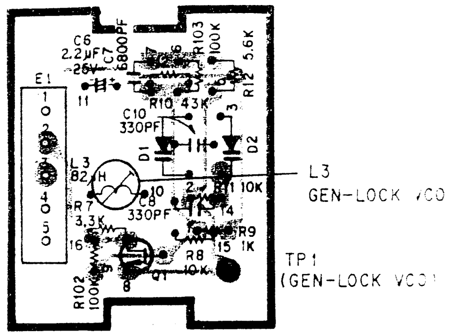
POWER/SYNC BOARD


VR1 SC ADJ
SW3 LEVEL INDICATOR ON/OFF SW
ON
OFF
CN1
CN2
IC10
F3 0.8A125V
(+4.9V)
VR2 ZEBRA LEVEL
VR3 +4.9V ADJ

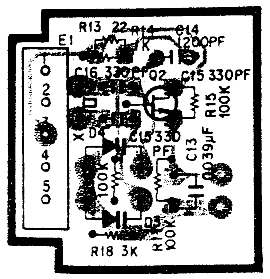
COMPONENT SIDE
PATTERN SIDE

1 2 3 4

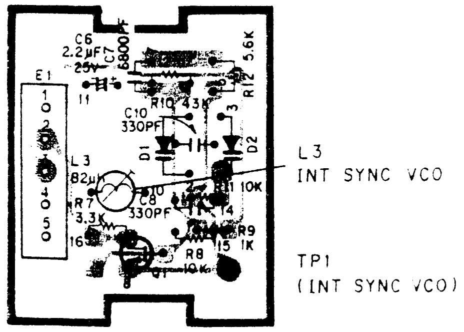
POWER/SYNC VIC-1 BOARD


E1
L3 GEN-LOCK VCO
TP1 (GEN-LOCK VCO)

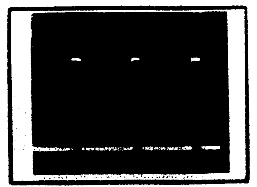
POWER/SYNC VIC-2 BOARD



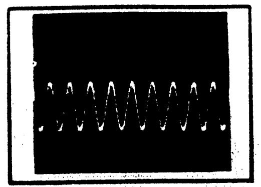
POWER/SYNC VIC-3 BOARD


E1
L3 INT SYNC VCO
TP1 (INT SYNC VCO)

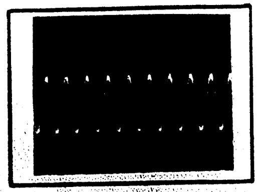
1. 1V/DIV, 20μs/DIV



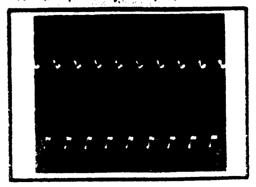
2. 0.5V/DIV, 0.5μs/DIV



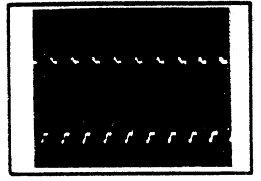
3. 0.5V/DIV, 0.5μs/DIV



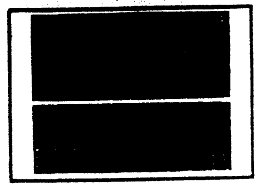
4. 1V/DIV, 0.2μs/DIV



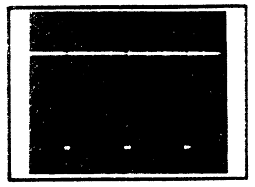
5. 1V/DIV, 0.2μs/DIV



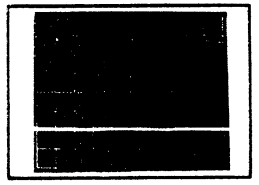
6. 1V/DIV, 50μs/DIV



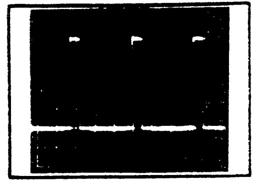
7. 1V/DIV, 20μs/DIV



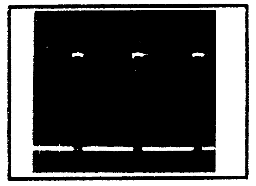
8. 1V/DIV, 5ms/DIV



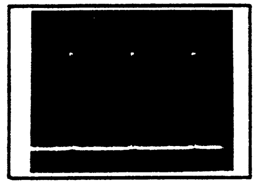
9. 1V/DIV, 20μs/DIV



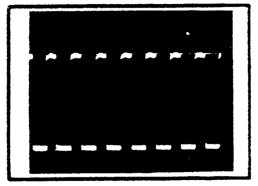
10. 1V/DIV, 20μs/DIV



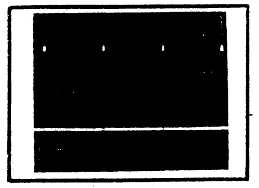
11. 1V/DIV, 20μs/DIV



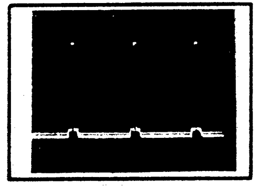
12. 1V/DIV, 50μs/DIV



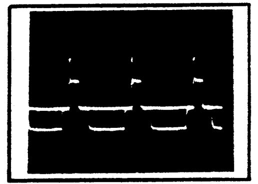
13. 1V/DIV, 20μs/DIV



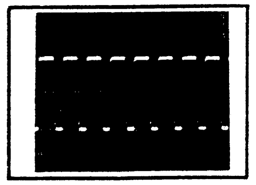
14. 1V/DIV, 20μs/DIV



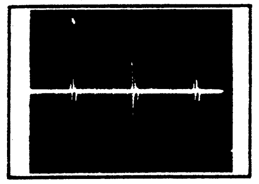
15. 1V/DIV, 20μs/DIV



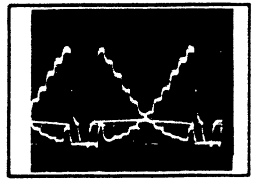
16. 0.2V/DIV, 50μs/DIV



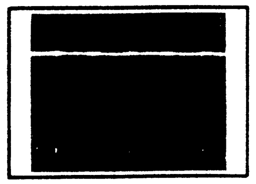
17. 50mV/DIV, 20μs/DIV



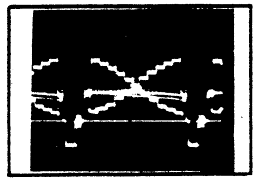
18. 0.1V/DIV, 10μs/DIV



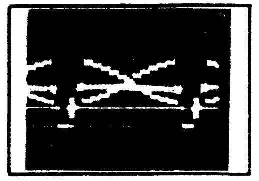
19. 50mV/DIV, 5ms/DIV



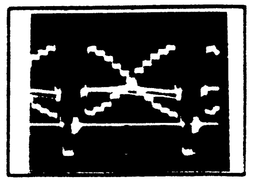
20. 0.2V/DIV, 10μs/DIV



21. 0.5V/DIV, 10μs/DIV



22. 20mV/DIV, 10μs/DIV



POWER/SYNC BOARD

IC1	MN74HC00S		D4, C4
IC2	MN6761S		C5, D5
IC3	MN67602PS		C7, D7
IC4	HB40		A4, A5
IC5	MN74HC74S		A6
IC6	NJM319M		A7
IC7	MN74HC00S		A8, B7
IC8	NJM2048MC		C3
IC9	M5218FP		B2, B3
IC10	NJM3414M		B2, B3
Q4	2SB709-Q	[A]	C8
Q5	2SB709-Q	[A]	C8
Q6	2SB709-Q	[A]	C9
Q7	2SD601-QR	[Y]	B4
Q8	2SD601-QR	[Y]	A8
Q9	2SC2404-CD	[U]	A9
Q10	2SD602-QRS	[W]	A2
Q11	2SC3303-0Y		A3
Q12	2SB837-CD		D2
Q13	2SB837-CD		C2
Q14	2SD601-QR	[Y]	C3
Q15	2SB970-QRS	[1R]	B3
Q16	2SD1266		B2
Q17	2SB710-Q	[C]	B2
Q18	2SC2404-CD	[U]	C6
Q19	2SC2404-CD	[U]	C7
Q20	2SC2404-CD	[U]	A2
Q200	2SC1047-D		B4
D5	1SV153		D7
D8	MA151K	[MH]	B7
D9	MA151K	[MH]	A8
D10	MA170		A2
D11	EU01A		A3
D12	EU01A		A3
D13	RD9.1EB3		A3
D14	RD18EB3		A3
D15	EK14		D2
D16	EK14		D2
D17	MA151K	[MH]	B3

POWER SYNC VIC-1 BOARD

Q1	2SK198-Q	[1O]	C4
D1	1SV153		C4
D2	1SV153		C4

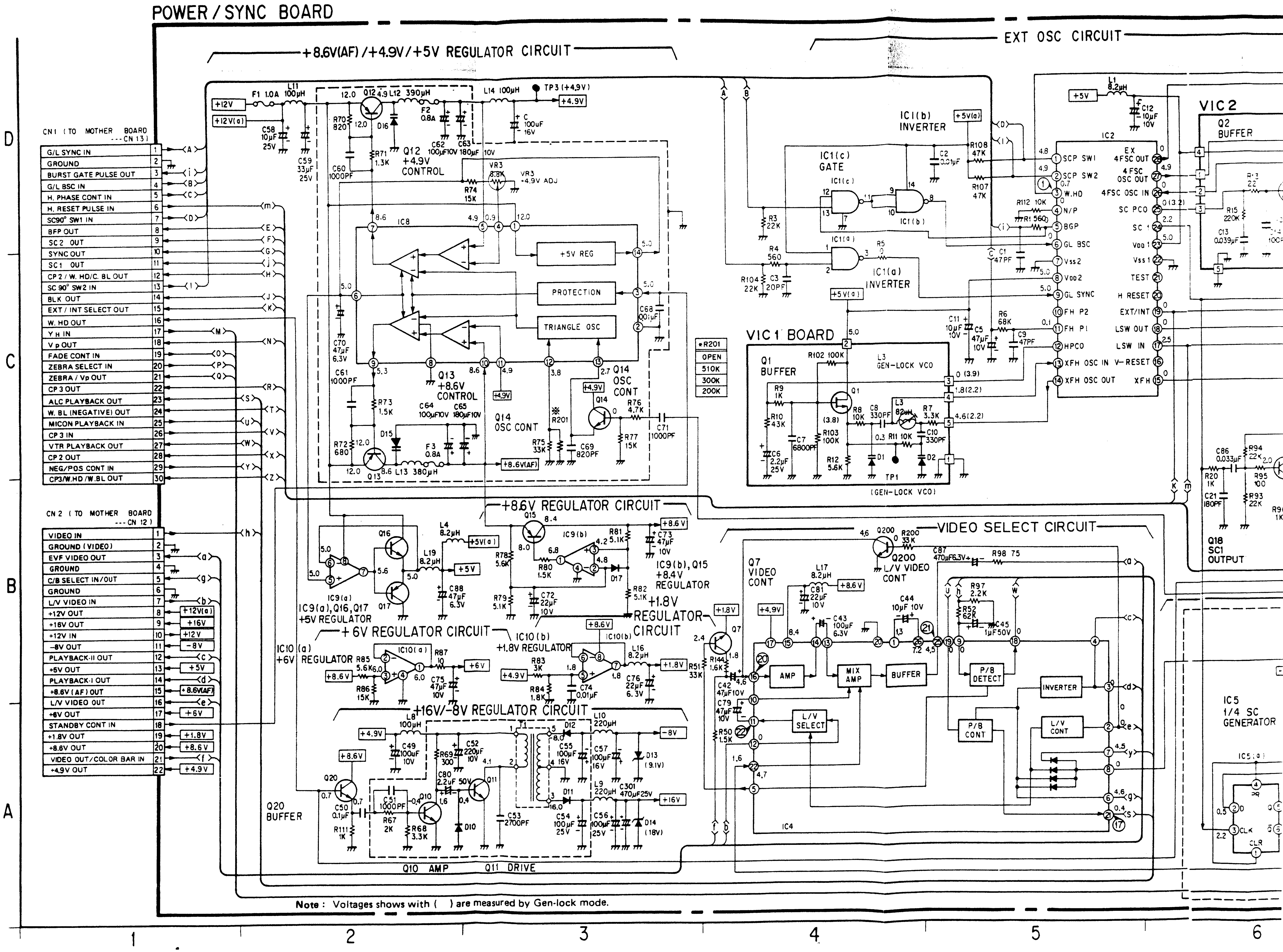
POWER SYNC VIC-2 BOARD

Q2	2SK198-Q	[1O]	D6
D3	1SV153		D6
D4	1SV153		D6

POWER SYNC VIC-3 BOARD

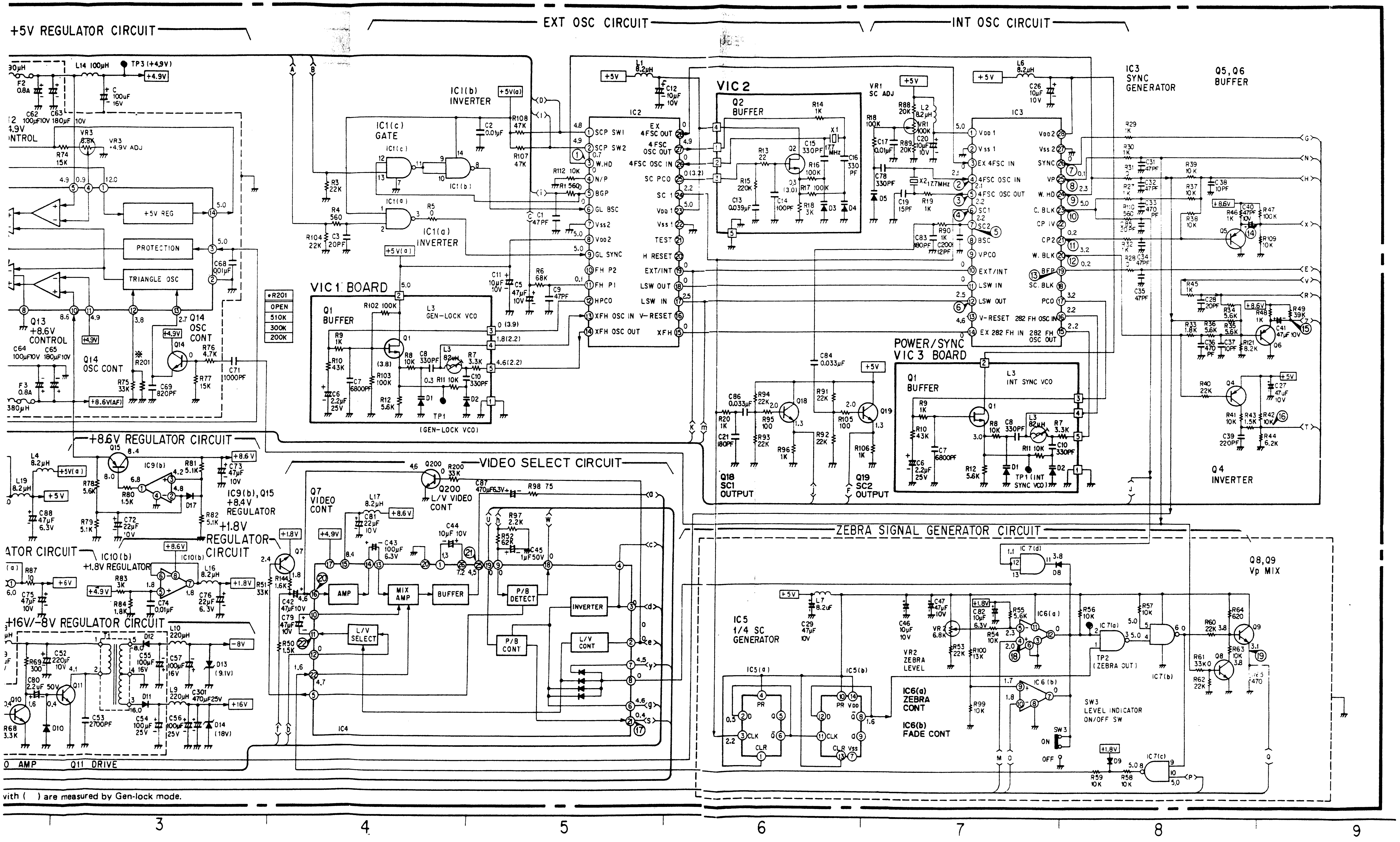
Q1	2SK198-Q	[1O]	C7
D1	1SV153		B7
D2	1SV153		B7

SCHEMATIC DIAGRAM OF POWER/SYNC BOARD


POWER / SYNC BOARD
+8.6V(AF)/+4.9V/+5V REGULATOR CIRCUIT
EXT OSC CIRCUIT
VIC2
Q2 BUFFER
IC2
IC1(b) INVERTER
IC1(c) GATE
IC1(a) INVERTER
VIC1 BOARD
Q1 BUFFER
L3 GEN-LOCK VCO
(GEN-LOCK VCO)
TP1
TP3 (+4.9V)
Q12 +4.9V CONTROL
VR3 +4.9V ADJ
IC8
+5V REG
PROTECTION
TRIANGLE OSC
Q13 +8.6V CONTROL
Q14 OSC CONT
*R201
OPEN
510K
300K
200K
+8.6V REGULATOR CIRCUIT
IC9(b), Q15 +8.4V REGULATOR
IC9(a), Q16, Q17 +5V REGULATOR
+6V REGULATOR CIRCUIT
IC10(a) +6V REGULATOR
IC10(b) +1.8V REGULATOR
+1.8V REGULATOR CIRCUIT
+16V/-8V REGULATOR CIRCUIT
Q10 AMP
Q11 DRIVE
Q20 BUFFER
VIDEO SELECT CIRCUIT
Q7 VIDEO CONT
Q200 L/V VIDEO CONT
AMP
MIX AMP
BUFFER
P/B DETECT
INVERTER
L/V SELECT
P/B CONT
L/V CONT
IC4
Q18 SC1 OUTPUT
IC5 1/4 SC GENERATOR
SCP SW1
SCP SW2
W.HD
N/P
BGP
GL BSC
Vss2
VDD2
GL SYNC
FH P2
FH P1
HPCO
XFH OSC IN
XFH OSC OUT
EX 4FSC OUT
4FSC OSC OUT
4FSC OSC IN
SC PCO
SC
VDD1
Vss1
TEST
H RESET
EXT/INT
LSW OUT
LSW IN
V-RESET
XFH
CN1 (TO MOTHER BOARD ---CN 13)
1 G/L SYNC IN
2 GROUND
3 BURST GATE PULSE OUT
4 G/L BSC IN
5 H. PHASE CONT IN
6 H. RESET PULSE IN
7 SC90° SW1 IN
8 BFP OUT
9 SC2 OUT
10 SYNC OUT
11 SC1 OUT
12 CP2 / W. HD/C. BL OUT
13 SC 90° SW2 IN
14 BLK OUT
15 EXT / INT SELECT OUT
16 W. HD OUT
17 YH IN
18 Vp OUT
19 FADE CONT IN
20 ZEBRA SELECT IN
21 ZEBRA / Vp OUT
22 CP 3 OUT
23 ALC PLAYBACK OUT
24 W. BL (NEGATIVE) OUT
25 MICON PLAYBACK IN
26 CP 3 IN
27 VTR PLAYBACK OUT
28 CP 2 OUT
29 NEG/POS CONT IN
30 CP3/W.HD /W.BL OUT
CN 2 (TO MOTHER BOARD ---CN 12)
1 VIDEO IN
2 GROUND (VIDEO)
3 EVF VIDEO OUT
4 GROUND
5 C/B SELECT IN/OUT
6 GROUND
7 L/V VIDEO IN
8 +12V OUT
9 +16V OUT
10 +12V IN
11 -8V OUT
12 PLAYBACK-II OUT
13 +5V OUT
14 PLAYBACK-I OUT
15 +8.6V (AF) OUT
16 L/V VIDEO OUT
17 +6V OUT
18 STANDBY CONT IN
19 +1.8V OUT
20 +8.6V OUT
21 VIDEO OUT/COLOR BAR IN
22 +4.9V OUT
+12V
+12V(a)
+16V
-8V
+5V
+8.6V(AF)
+6V
+1.8V
+8.6V
+4.9V
D
C
B
A
1
2
3
4
5
6

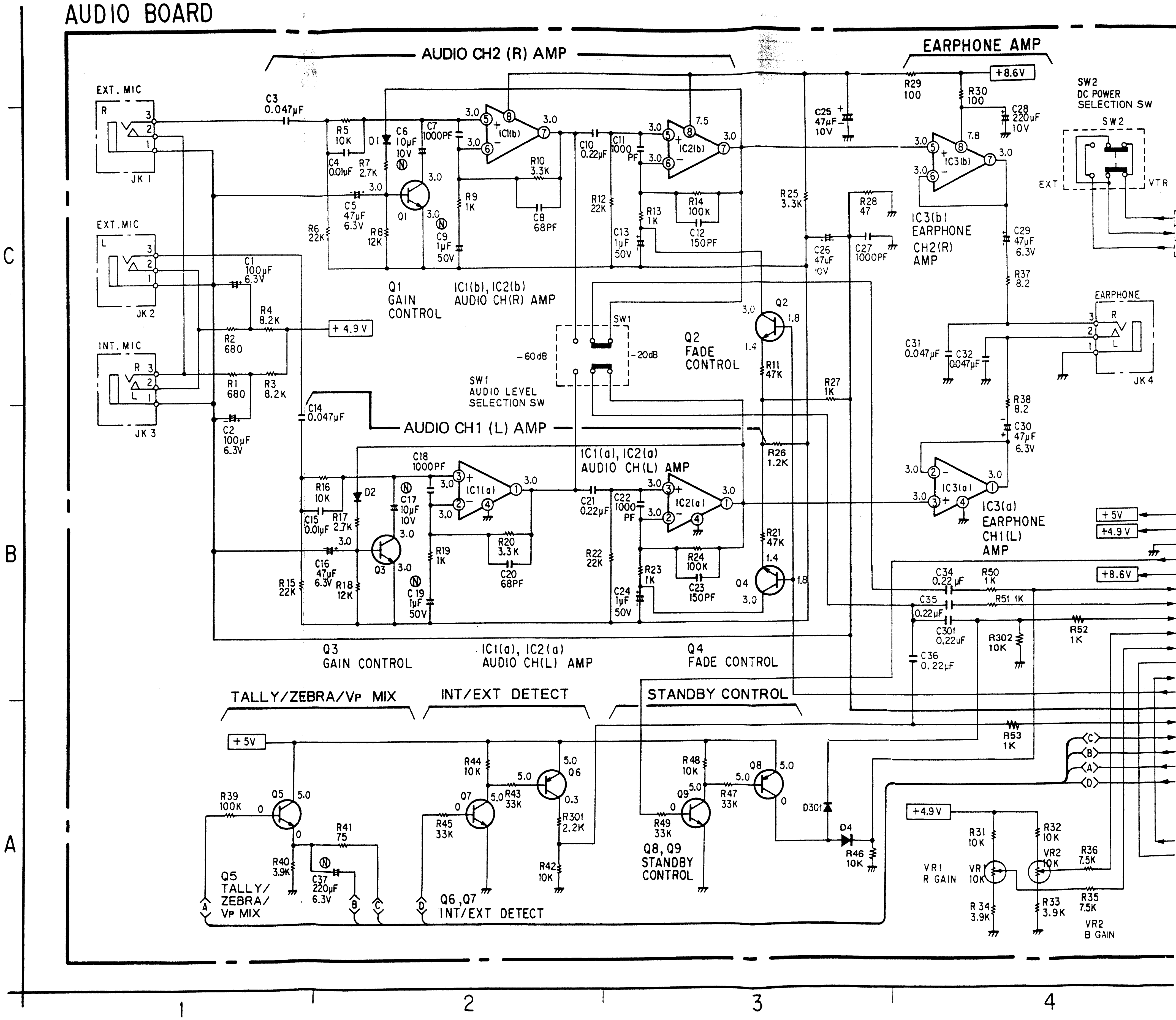
Note : Voltages shows with ( ) are measured by Gen-lock mode.

SCHEMATIC DIAGRAM OF POWER/SYNC BOARD

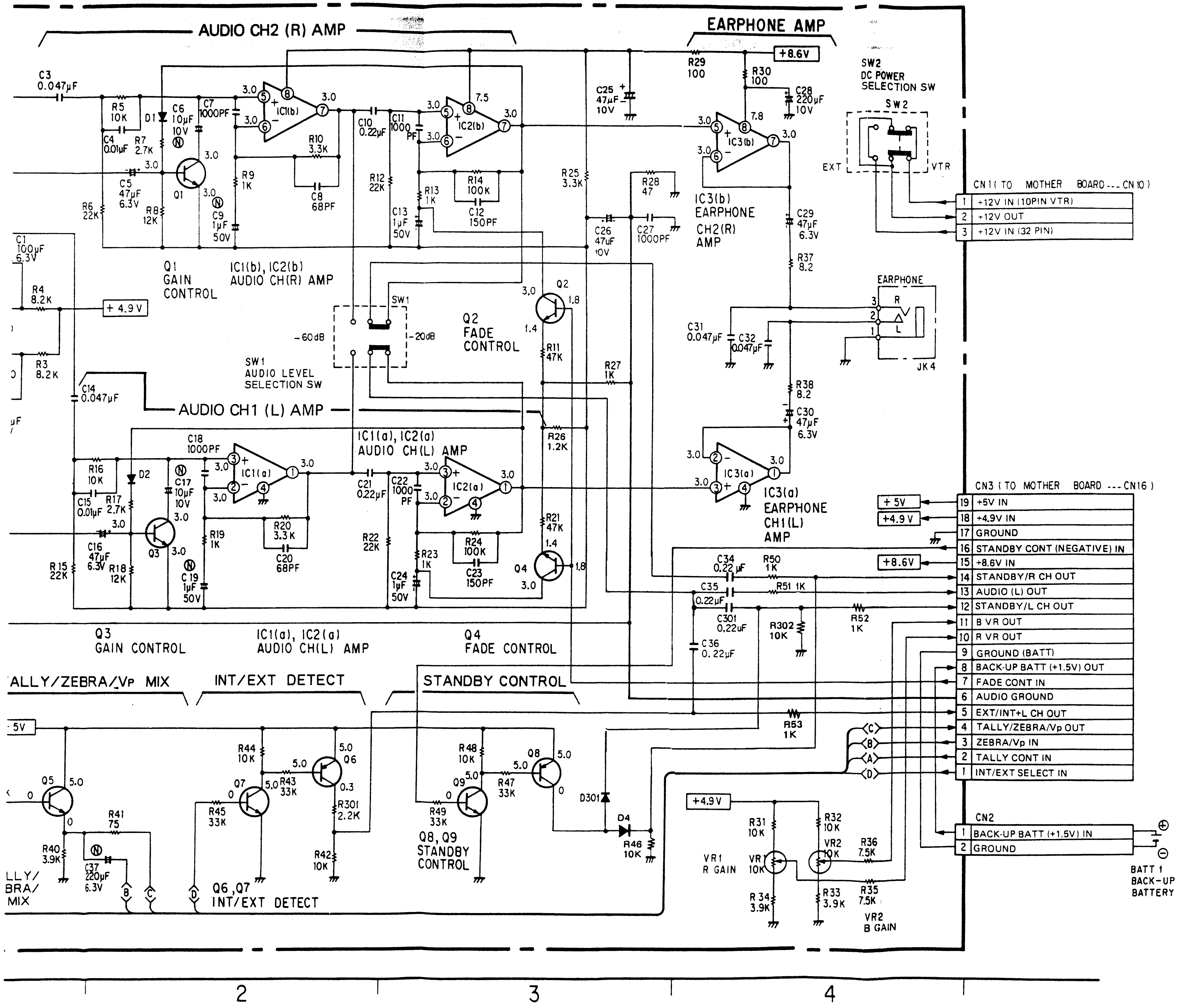

+5V REGULATOR CIRCUIT
EXT OSC CIRCUIT
INT OSC CIRCUIT
TP3 (+4.9V)
+4.9V
VR3 +4.9V ADJ
+5V REG
PROTECTION
TRIANGLE OSC
Q13 +8.6V CONTROL
Q14 OSC CONT
*R201
OPEN
510K
300K
200K
IC1(b) INVERTER
IC1(c) GATE
IC1(a) INVERTER
IC2
SCP SW1
SCP SW2
W.HD
N/P
BGP
GL BSC
Vss2
VDD2
GL SYNC
FH P2
FH P1
HPCO
XFH OSC IN
XFH OSC OUT
EX 4FSC OUT
4FSC OSC OUT
4FSC OSC IN
SC PCO
SC 1
VDD 1
Vss 1
TEST
H RESET
EXT/INT
LSW OUT
LSW IN
V-RESET
XFH
VIC 1 BOARD
Q1 BUFFER
L3 GEN-LOCK VCO
TP1
(GEN-LOCK VCO)
VIC 2
Q2 BUFFER
VR1 SC ADJ
IC3
VDD 1
Vss 1
EX 4FSC IN
4FSC OSC IN
4FSC OSC OUT
SC1
SC2
BSC
VPCO
EXT/INT
LSW IN
LSW OUT
V-RESET 282 FH OSC IN
EX 282 FH IN 282 FH OSC OUT
VDD2
Vss 2
SYNC
VP
W. HD
C. BLK
CP IV
CP2
W. BLK
BFP
SC. BLK
PCO
IC3 SYNC GENERATOR
Q5, Q6 BUFFER
POWER/SYNC VIC 3 BOARD
Q1 BUFFER
L3 INT SYNC VCO
TP1 (INT SYNC VCO)
Q18 SC1 OUTPUT
Q19 SC2 OUTPUT
Q4 INVERTER
+8.6V REGULATOR CIRCUIT
IC9(b), Q15 +8.4V REGULATOR
+1.8V REGULATOR CIRCUIT
IC10(b) +1.8V REGULATOR
ATOR CIRCUIT
VIDEO SELECT CIRCUIT
Q7 VIDEO CONT
Q200 L/V VIDEO CONT
AMP
MIX AMP
BUFFER
P/B DETECT
INVERTER
L/V SELECT
P/B CONT
L/V CONT
IC4
+16V/-8V REGULATOR CIRCUIT
O AMP
Q11 DRIVE
ZEBRA SIGNAL GENERATOR CIRCUIT
IC5 1/4 SC GENERATOR
IC5(a)
IC5(b)
IC6(a) ZEBRA CONT
IC6(b) FADE CONT
VR2 ZEBRA LEVEL
TP2 (ZEBRA OUT)
IC7(b)
SW3 LEVEL INDICATOR ON/OFF SW
Q8, Q9 Vp MIX
3
4
5
6
7
8
9

vith ( ) are measured by Gen-lock mode.

SCHEMATIC DIAGRAM OF AUDIO BOARD


AUDIO BOARD
AUDIO CH2 (R) AMP
AUDIO CH1 (L) AMP
EARPHONE AMP
EXT. MIC
JK 1
JK 2
INT. MIC
JK 3
C3 0.047μF
R5 10K
D1
C6 10μF 10V
C7 1000PF
IC1(b)
IC2(b)
R10 3.3K
C8 68PF
R9 1K
C10 0.22μF
C11 1000PF
R12 22K
R13 1K
R14 100K
C12 150PF
C13 1μF 50V
C4 0.01μF
R7 2.7K
C5 47μF 6.3V
R6 22K
R8 12K
Q1
C9 1μF 50V
Q1 GAIN CONTROL
IC1(b), IC2(b) AUDIO CH(R) AMP
C1 100μF 6.3V
R4 8.2K
+4.9V
R2 680
R1 680
R3 8.2K
C2 100μF 6.3V
C14 0.047μF
SW1
-60dB
-20dB
SW1 AUDIO LEVEL SELECTION SW
Q2 FADE CONTROL
R11 47K
C25 47μF 10V
R25 3.3K
R28 47
C26 47μF 10V
C27 1000PF
R27 1K
R26 1.2K
R29 100
R30 100
+8.6V
C28 220μF 10V
IC3(b)
IC3(b) EARPHONE CH2(R) AMP
C29 47μF 6.3V
R37 8.2
SW2 DC POWER SELECTION SW
EXT
VTR
EARPHONE
JK4
C31 0.047μF
C32 0.047μF
R38 8.2
C30 47μF 6.3V
IC3(a)
IC3(a) EARPHONE CH1(L) AMP
R16 10K
D2
C18 1000PF
IC1(a)
IC2(a)
IC1(a), IC2(a) AUDIO CH(L) AMP
C15 0.01μF
R17 2.7K
C17 10μF 10V
C16 47μF 6.3V
R15 22K
R18 12K
Q3
R19 1K
C19 1μF 50V
R20 3.3K
C20 68PF
C21 0.22μF
C22 1000PF
R22 22K
R23 1K
C24 1μF 50V
R24 100K
C23 150PF
R21 47K
Q4
Q3 GAIN CONTROL
IC1(a), IC2(a) AUDIO CH(L) AMP
Q4 FADE CONTROL
C34 0.22μF
R50 1K
C35 0.22μF
R51 1K
C301 0.22uF
R302 10K
R52 1K
C36 0.22μF
+5V
+4.9V
+8.6V
TALLY/ZEBRA/VP MIX
INT/EXT DETECT
STANDBY CONTROL
+5V
R39 100K
Q5
R41 75
R40 3.9K
C37 220μF 6.3V
Q5 TALLY/ZEBRA/VP MIX
R44 10K
Q6
Q7
R43 33K
R45 33K
R301 2.2K
R42 10K
Q6, Q7 INT/EXT DETECT
R48 10K
Q8
Q9
R47 33K
R49 33K
Q8, Q9 STANDBY CONTROL
D301
D4
R46 10K
R53 1K
+4.9V
R31 10K
R32 10K
VR1 R GAIN
VR1 10K
VR2 10K
R36 7.5K
R34 3.9K
R33 3.9K
R35 7.5K
VR2 B GAIN
A
B
C
D
1
2
3
4

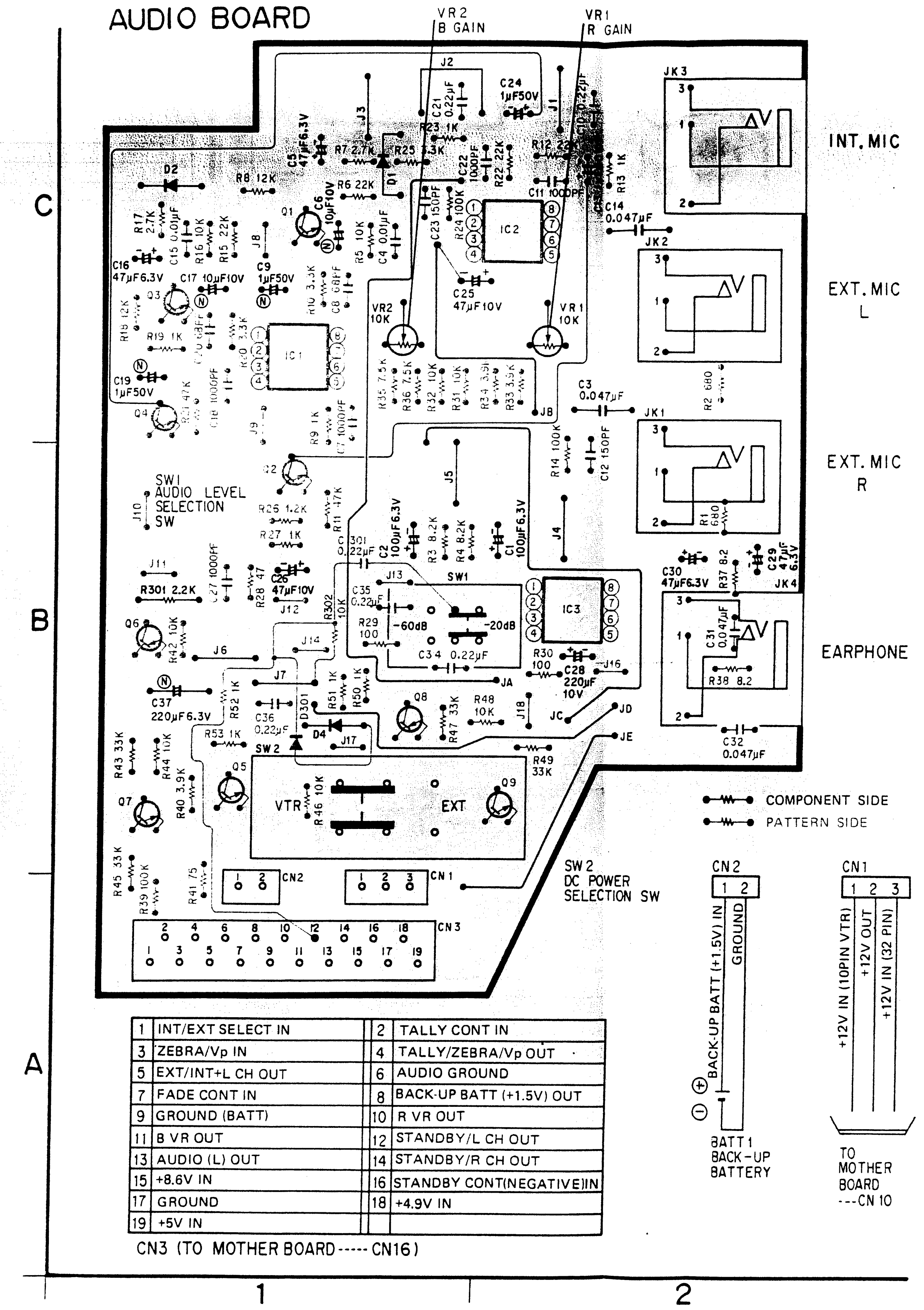
SCHEMATIC DIAGRAM OF AUDIO BOARD


AUDIO CH2 (R) AMP
EARPHONE AMP
AUDIO CH1 (L) AMP
Q1 GAIN CONTROL
IC1(b), IC2(b) AUDIO CH(R) AMP
Q2 FADE CONTROL
SW1 AUDIO LEVEL SELECTION SW
-60dB
-20dB
IC3(b) EARPHONE CH2(R) AMP
IC3(a) EARPHONE CH1(L) AMP
IC1(a), IC2(a) AUDIO CH(L) AMP
Q3 GAIN CONTROL
Q4 FADE CONTROL
SW2 DC POWER SELECTION SW
EXT
VTR
EARPHONE
JK4
+8.6V
+4.9V
+5V
ALLY/ZEBRA/Vp MIX
INT/EXT DETECT
STANDBY CONTROL
Q6, Q7 INT/EXT DETECT
Q8, Q9 STANDBY CONTROL
VR1 R GAIN
VR2 B GAIN
CN1 (TO MOTHER BOARD --- CN10)
1 +12V IN (10PIN VTR)
2 +12V OUT
3 +12V IN (32 PIN)
CN3 (TO MOTHER BOARD --- CN16)
19 +5V IN
18 +4.9V IN
17 GROUND
16 STANDBY CONT (NEGATIVE) IN
15 +8.6V IN
14 STANDBY/R CH OUT
13 AUDIO (L) OUT
12 STANDBY/L CH OUT
11 B VR OUT
10 R VR OUT
9 GROUND (BATT)
8 BACK-UP BATT (+1.5V) OUT
7 FADE CONT IN
6 AUDIO GROUND
5 EXT/INT+L CH OUT
4 TALLY/ZEBRA/Vp OUT
3 ZEBRA/Vp IN
2 TALLY CONT IN
1 INT/EXT SELECT IN
CN2
1 BACK-UP BATT (+1.5V) IN
2 GROUND
BATT 1 BACK-UP BATTERY
2
3
4

AUDIO BOARD

IC1	NJM4558MD		B2, C2
IC2	NJM4558MD		B3, C3
IC3	NJM3415M		B4, C4
Q1	2SC2405STU	[S]	C2
Q2	2SD601-Q	[Y]	C3
Q3	2SC2405STU	[S]	B2
Q4	2SD601-Q	[S]	B3
Q5	2SD601-QR	[S]	A1
Q6	2SB709-Q	[A]	A2
Q7	2SD601-QR	[Y]	A2
Q8	2SB709-Q	[A]	A3
Q9	2SD601-QR	[Y]	A3
D1	MA165		C2
D2	MA165		B2
D301	MA165		A3
D4	MA165		A3

CONDUCTOR VIEW OF AUDIO BOARD


AUDIO BOARD
VR2
B GAIN
VR1
R GAIN
C
B
A
1
2
J2
C24 1μF50V
J1
J3
C21 0.22μF
R23 1K
R7 2.7K
R25 3.3K
R12 22K
R13 1K
C5 47μF6.3V
C22 1000PF
R22 22K
C11 1000PF
C14 0.047μF
D2
R8 12K
R6 22K
D1
C23 150PF
R24 100K
IC2
C6 10μF10V
Q1
R17 2.7K
C15 0.01μF
R16 10K
R15 22K
J8
R5 10K
C4 0.01μF
C16 47μF6.3V
C17 10μF10V
C9 1μF50V
R10 3.3K
C8 68PF
C25 47μF10V
Q3
R18 12K
R19 1K
C20 68PF
R20 3.3K
IC1
VR2 10K
VR1 10K
C19 1μF50V
R21 47K
C18 1000PF
R35 7.5K
R36 7.5K
R32 10K
R31 10K
R34 3.9K
R33 3.9K
JB
C3 0.047μF
R2 680
Q4
J9
R9 1K
C7 1000PF
R14 100K
C12 150PF
Q2
J5
SW1
AUDIO LEVEL
SELECTION
SW
J10
R26 1.2K
R11 47K
C2 100μF6.3V
R3 8.2K
R4 8.2K
C1 100μF6.3V
J4
R1 680
R27 1K
C301 0.22μF
J11
C27 1000PF
R28 47
C26 47μF10V
J13
SW1
C30 47μF6.3V
R37 8.2
C29 47μF 6.3V
R301 2.2K
J12
R302 10K
C35 0.22μF
R29 100
-60dB
-20dB
IC3
Q6
R42 10K
J14
C34 0.22μF
R30 100
C28 220μF 10V
J16
C31 0.047μF
R38 8.2
J6
J7
JA
C37 220μF6.3V
R52 1K
C36 0.22μF
D301
R51 1K
R50 10K
Q8
R47 33K
R48 10K
J18
JC
JD
JE
C32 0.047μF
R53 1K
D4
J17
SW2
R49 33K
R43 33K
R44 10K
R40 3.9K
Q5
Q7
VTR
R46 10K
EXT
Q9
R45 33K
R39 100K
R41 75
CN2
CN1
CN3
SW2
DC POWER
SELECTION SW
JK3
INT. MIC
JK2
EXT. MIC
L
JK1
EXT. MIC
R
JK4
EARPHONE
COMPONENT SIDE
PATTERN SIDE
CN2
1 2
BACK-UP BATT (+1.5V) IN
GROUND
BATT1
BACK-UP
BATTERY
CN1
1 2 3
+12V IN (10PIN VTR)
+12V OUT
+12V IN (32 PIN)
TO
MOTHER
BOARD
---CN10

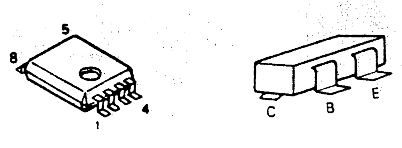
1	INT/EXT SELECT IN	2	TALLY CONT IN
3	ZEBRA/Vp IN	4	TALLY/ZEBRA/Vp OUT
5	EXT/INT+L CH OUT	6	AUDIO GROUND
7	FADE CONT IN	8	BACK-UP BATT (+1.5V) OUT
9	GROUND (BATT)	10	R VR OUT
11	B VR OUT	12	STANDBY/L CH OUT
13	AUDIO (L) OUT	14	STANDBY/R CH OUT
15	+8.6V IN	16	STANDBY CONT(NEGATIVE)IN
17	GROUND	18	+4.9V IN
19	+5V IN		

CN3 (TO MOTHER BOARD----- CN16)

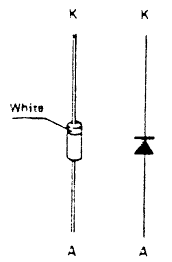
AUDIO BOARD

NJM3415M
NJM4558MD

2SB709-Q
2SC2405STU
2SD601-Q



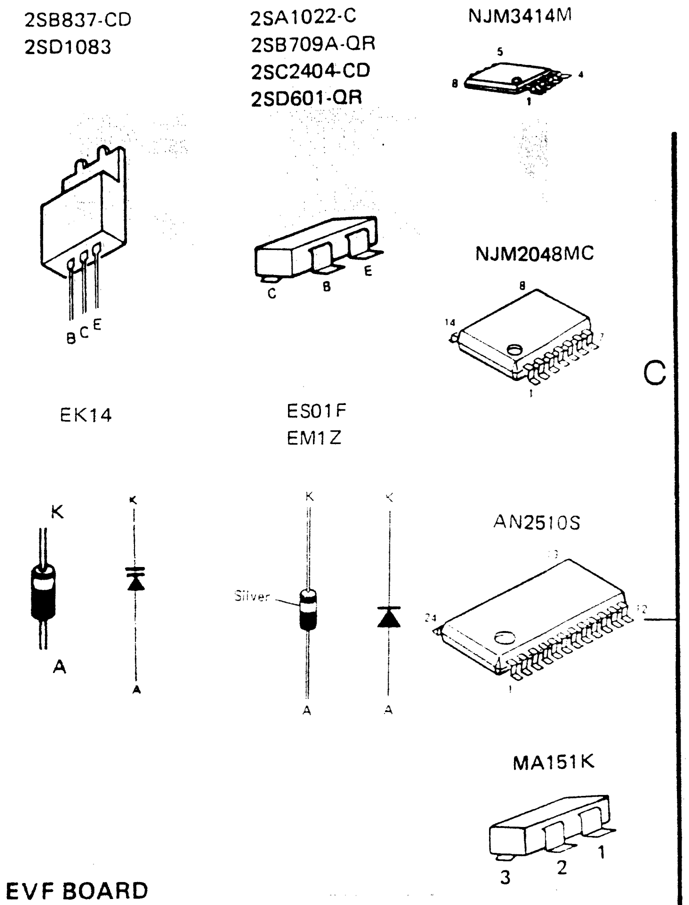
MA165



AUDIO BOARD

IC1	NJM4558MD		C1
IC2	NJM4558MD		C2
IC3	NJM3415M		B2
Q1	2SC2405STU	[S]	C1
Q2	2SD601-Q	[Y]	B1
Q3	2SC2405STU	[S]	C1
Q4	2SD601-Q	[S]	B1
Q5	2SD601-QR	[S]	B1
Q6	2SB709-Q	[A]	A1
Q7	2SD601-QR	[Y]	B1
Q8	2SB709-Q	[A]	B1
Q9	2SD601-QR	[Y]	B1
D1	MA165		C1
D2	MA165		C1
D301	MA165		B1
D4	MA165		B1

CONDUCTOR VIEW OF 1″ VIEWFINDER WV-VF01



2SB837-CD
2SD1083
B C E
2SA1022-C
2SB709A-QR
2SC2404-CD
2SD601-QR
C B E
NJM3414M
NJM2048MC
EK14
K
A
ES01F
EM1Z
Silver
AN2510S
MA151K
3 2 1

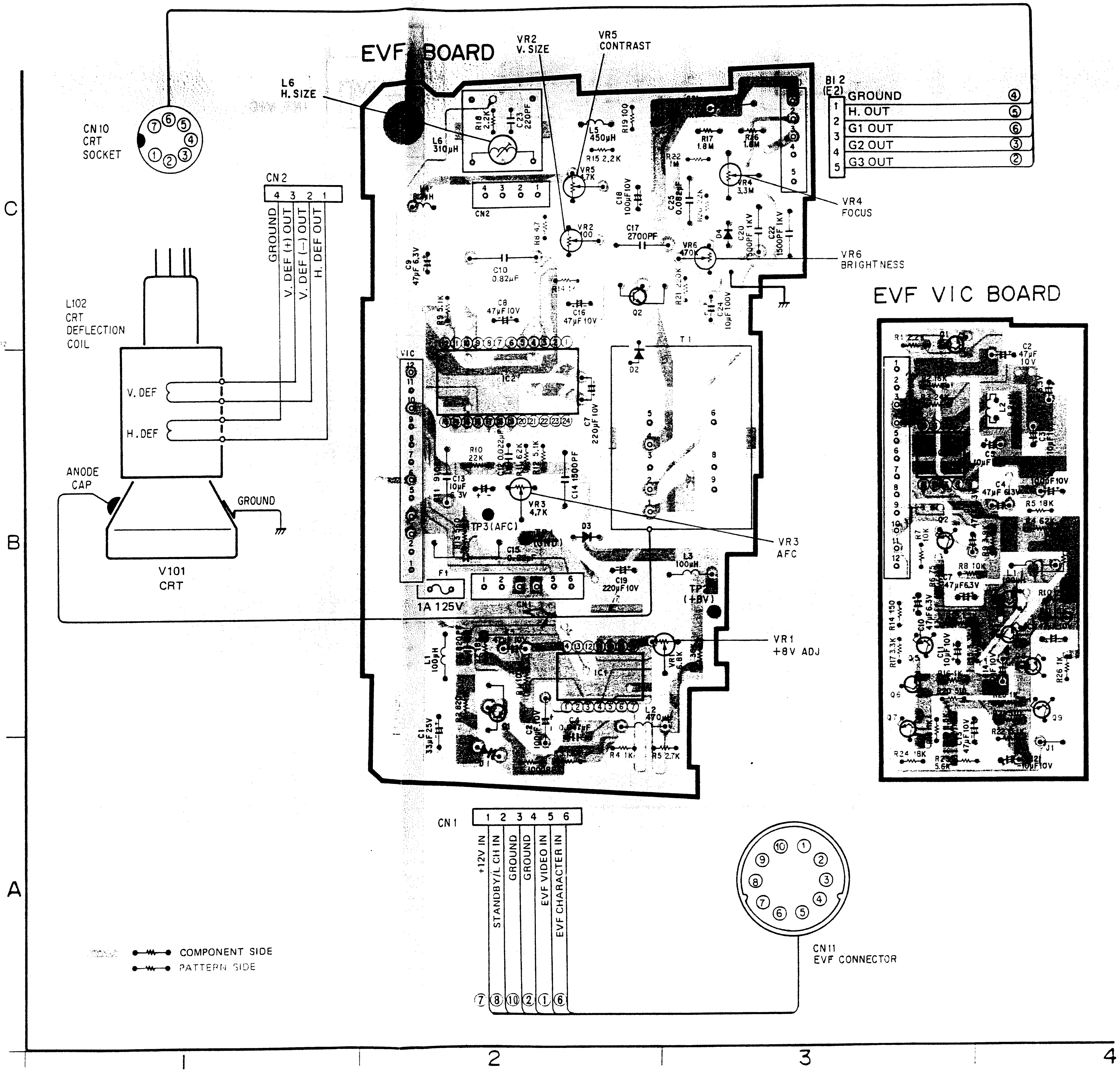
1 : NC
2 : Anode
3 : Cathode

EVF BOARD

IC1	NJM2048MC		B2
IC2	AN2510S		B2
Q1	2SB837-CD		B2
Q2	2SD1083		C2
Q3	2SB709A-QR	[B]	C3
D1	EK14		A2
D2	MA151K	[MH]	C2
D3	EM1Z		B2
D4	ES01F		C3

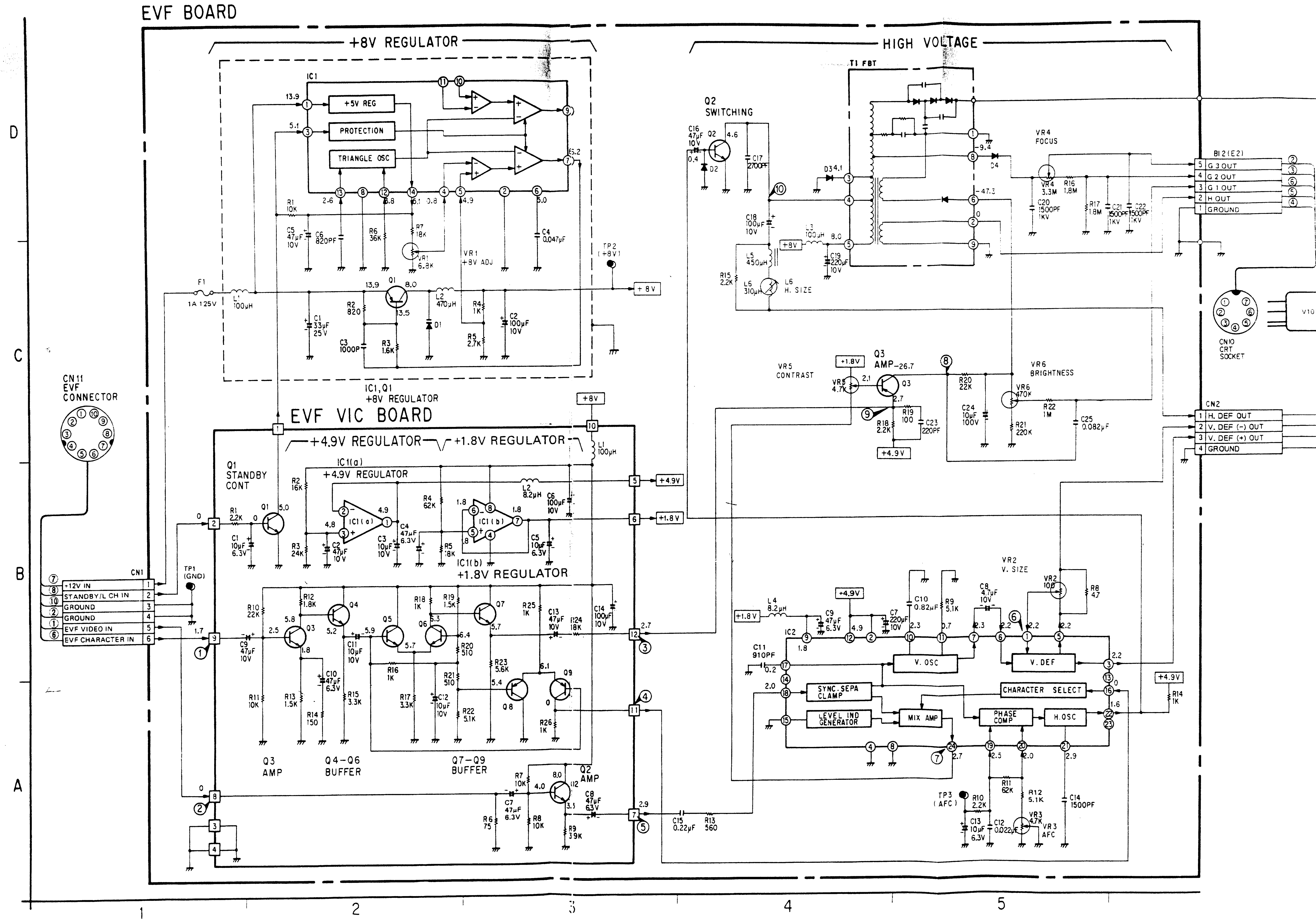
EVF VIC BOARD

-IC1	NJM3414M		B3
Q1	2SD601-QR	[Y]	C3
Q2	2SD601-QR	[Y]	B3
Q3	2SC2404-CD	[U]	B4
Q4	2SD601-QR	[Y]	B4
Q5	2SC2404-CD	[U]	B3
Q6	2SC2404-CD	[U]	B3
Q7	2SD601-QR	[Y]	B3
Q8	2SA1022-C	[E]	B4
Q9	2SA1022-C	[E]	B4

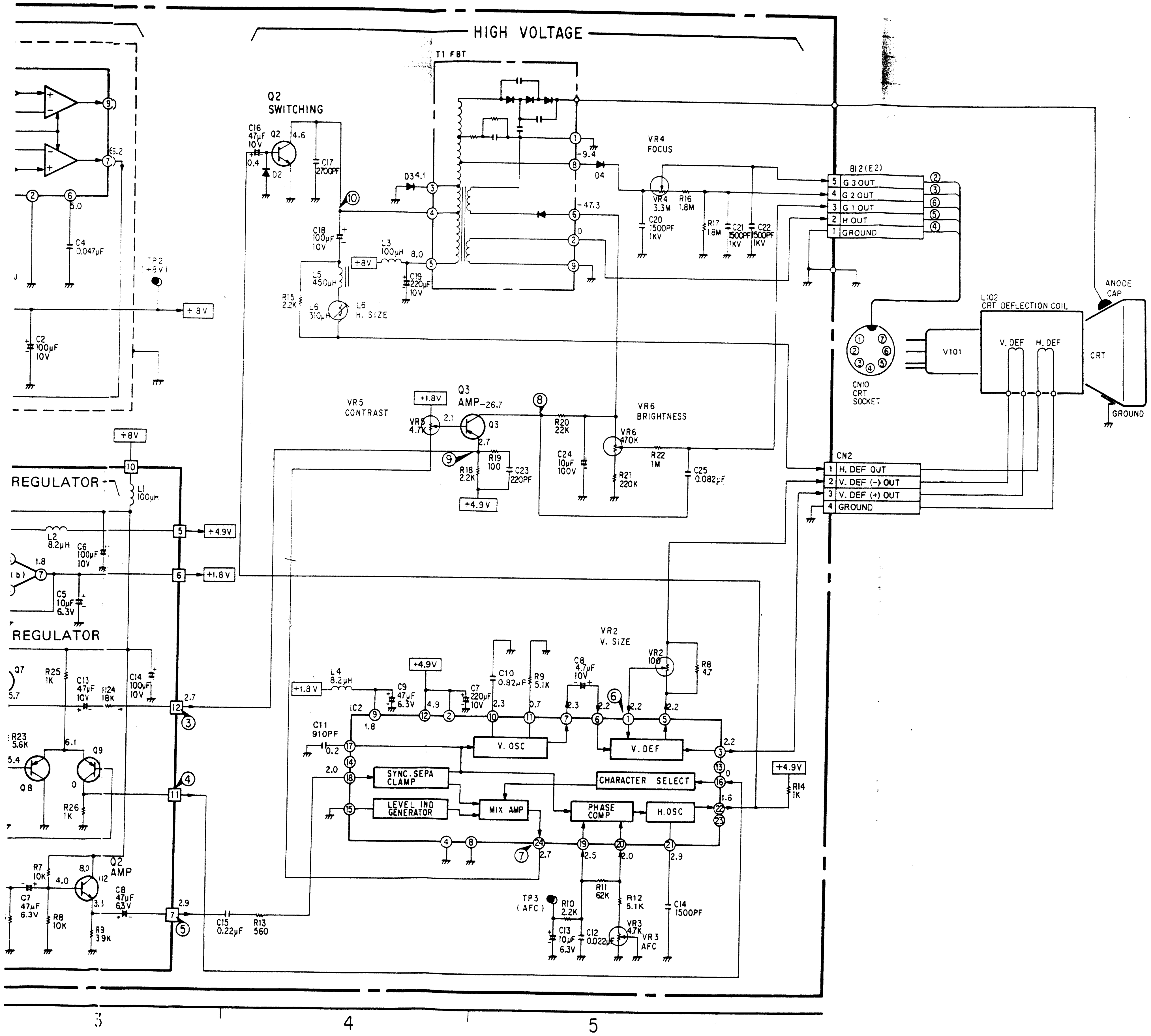


EVF BOARD
VR2 V. SIZE
VR5 CONTRAST
L6 H. SIZE
CN10 CRT SOCKET
CN2
4 3 2 1
GROUND
V. DEF (+) OUT
V. DEF (–) OUT
H. DEF OUT
L102 CRT DEFLECTION COIL
V. DEF
H. DEF
ANODE CAP
GROUND
V101 CRT
BI 2 (E2)
1 GROUND ④
2 H. OUT ⑤
3 G1 OUT ⑥
4 G2 OUT ③
5 G3 OUT ②
VR4 FOCUS
VR6 BRIGHTNESS
VR3 AFC
VR1 +8V ADJ
TP3 (AFC)
TP (+8V)
F1 1A 125V
IC1
IC2
T1
CN1
1 2 3 4 5 6
+12V IN
STANDBY/L CH IN
GROUND
GROUND
EVF VIDEO IN
EVF CHARACTER IN
⑦ ⑧ ⑩ ② ① ⑥
CN11 EVF CONNECTOR
EVF VIC BOARD
COMPONENT SIDE
PATTERN SIDE
A
B
C
1
2
3
4

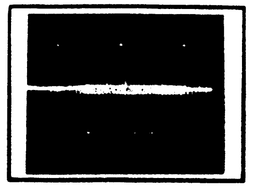
SCHEMATIC DIAGRAM OF 1″ VIEWFINDER WV-VF01


EVF BOARD
+8V REGULATOR
IC1
+5V REG
PROTECTION
TRIANGLE OSC
IC1, Q1
+8V REGULATOR
F1
1A 125V
L1 100μH
C1 33μF 25V
R2 820
C3 1000P
R3 1.6K
Q1
L2 470μH
D1
R4 1K
R5 2.7K
C2 100μF 10V
R1 10K
C5 47μF 10V
C6 820PF
R6 36K
R7 18K
VR1 6.8K
VR1 +8V ADJ
C4 0.047μF
TP2 (+8V)
+8V
HIGH VOLTAGE
T1 FBT
Q2 SWITCHING
C16 47μF 10V
D2
C17 2700PF
D3
C18 100μF 10V
L3 100μH
C19 220μF 10V
L5 450μH
R15 2.2K
L6 310μH
L6 H. SIZE
D4
VR4 FOCUS
VR4 3.3M
R16 1.8M
C20 1500PF 1KV
R17 1.8M
C21 1500PF 1KV
C22 1500PF 1KV
B12 (E2)
5 G3 OUT
4 G2 OUT
3 G1 OUT
2 H OUT
1 GROUND
CN10 CRT SOCKET
V10
VR5 CONTRAST
+1.8V
Q3 AMP
VR5 4.7K
R18 2.2K
R19 100
C23 220PF
+4.9V
R20 22K
C24 10μF 100V
VR6 BRIGHTNESS
VR6 470K
R22 1M
R21 220K
C25 0.082μF
CN2
1 H. DEF OUT
2 V. DEF (−) OUT
3 V. DEF (+) OUT
4 GROUND
CN11 EVF CONNECTOR
CN1
+12V IN
STANDBY/L CH IN
GROUND
GROUND
EVF VIDEO IN
EVF CHARACTER IN
TP1 (GND)
EVF VIC BOARD
+4.9V REGULATOR
+1.8V REGULATOR
IC1(a)
+4.9V REGULATOR
Q1 STANDBY CONT
R1 2.2K
C1 10μF 6.3V
R2 16K
R3 24K
C2 47μF 10V
IC1(a)
C3 10μF 10V
C4 47μF 6.3V
R4 62K
R5 18K
IC1(b)
IC1(b) +1.8V REGULATOR
L2 8.2μH
C6 100μF 10V
C5 10μF 6.3V
L1 100μH
+4.9V
+1.8V
R10 22K
C9 47μF 10V
R12 1.8K
R11 10K
R13 1.5K
R14 150
C10 47μF 6.3V
R15 3.3K
C11 10μF 10V
R16 1K
R17 3.3K
R18 1K
R19 1.5K
R20 510
R21 510
C12 10μF 10V
R22 5.1K
R23 5.6K
R25 1K
C13 47μF 10V
R24 18K
C14 100μF 10V
R26 1K
Q3 AMP
Q4–Q6 BUFFER
Q7–Q9 BUFFER
R7 10K
C7 47μF 6.3V
R6 75
R8 10K
Q2 AMP
C8 47μF 63V
R9 39K
C15 0.22μF
R13 560
L4 8.2μH
C9 47μF 6.3V
IC2
C11 910PF
C10 0.82μF
R9 5.1K
C7 220μF 10V
C8 4.7μF 10V
VR2 V. SIZE
VR2 100
R8 47
V. OSC
V. DEF
SYNC. SEPA CLAMP
CHARACTER SELECT
LEVEL IND GENERATOR
MIX AMP
PHASE COMP
H. OSC
R14 1K
TP3 (AFC)
R10 2.2K
R11 62K
R12 5.1K
C13 10μF 6.3V
C12 0.022μF
VR3 4.7K
VR3 AFC
C14 1500PF
D
C
B
A
1
2
3
4
5

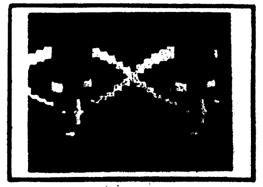
TIC DIAGRAM OF 1" VIEWFINDER WV-VF01


HIGH VOLTAGE
T1 FBT
Q2 SWITCHING
C16 47μF 10V
C17 2700PF
D2
D3
C18 100μF 10V
L3 100μH
L5 450μH
R15 2.2K
L6 310μH
L6 H. SIZE
C19 220μF 10V
VR4 FOCUS
VR4 3.3M
R16 1.8M
C20 1500PF 1KV
R17 1.8M
C21 1500PF 1KV
C22 1500PF 1KV
D4
B12 (E2)
5 G 3 OUT
4 G 2 OUT
3 G 1 OUT
2 H OUT
1 GROUND
ANODE CAP
L102 CRT DEFLECTION COIL
V. DEF
H. DEF
V101
CRT
CN10 CRT SOCKET
GROUND
VR5 CONTRAST
VR5 4.7K
Q3 AMP
R20 22K
VR6 BRIGHTNESS
VR6 470K
R22 1M
R18 2.2K
R19 100
C23 220PF
C24 10μF 100V
R21 220K
C25 0.082μF
CN2
1 H. DEF OUT
2 V. DEF (−) OUT
3 V. DEF (+) OUT
4 GROUND
+8V
+1.8V
+4.9V
REGULATOR
L1 100μH
L2 8.2μH
C6 100μF 10V
C5 10μF 6.3V
REGULATOR
R25 1K
C13 47μF 10V
R24 18K
C14 100μF 10V
R23 5.6K
Q7
Q8
Q9
R26 1K
R7 10K
C7 47μF 6.3V
R8 10K
Q2 AMP
C8 47μF 6.3V
R9 39K
C15 0.22μF
R13 560
C2 100μF 10V
C4 0.047μF
TP2 (+8V)
VR2 V. SIZE
VR2 100
R8 47
L4 8.2μH
C9 47μF 6.3V
C7 220μF 10V
C10 0.82μF
R9 5.1K
C8 4.7μF 10V
IC2
C11 910PF
V. OSC
V. DEF
SYNC. SEPA CLAMP
CHARACTER SELECT
LEVEL IND GENERATOR
MIX AMP
PHASE COMP
H. OSC
R14 1K
TP3 (AFC)
R10 2.2K
C13 10μF 6.3V
C12 0.022μF
R11 62K
R12 5.1K
VR3 4.7K
VR3 AFC
C14 1500PF
3
4
5

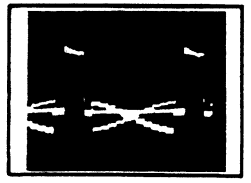
1. 50mV/DIV, 5ms/DIV



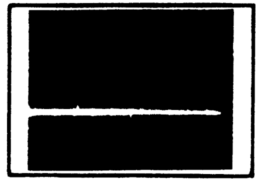
2. 0.2V/DIV, 10μs/DIV



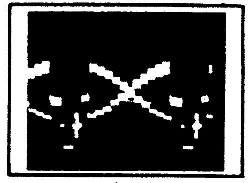
3. 0.2V/DIV, 10μs/DIV



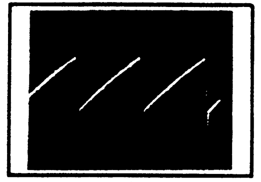
4. 1V/DIV, 5ms/DIV



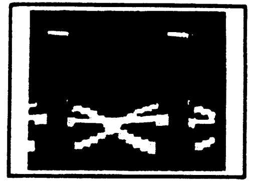
5. 0.2V/DIV, 10μs/DIV



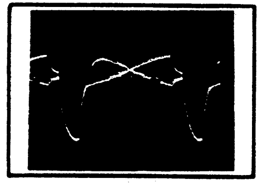
6. 0.5V/DIV, 5ms/DIV



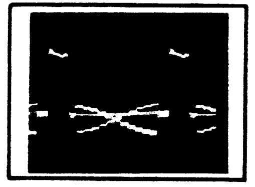
7. 0.5V/DIV, 10μs/DIV



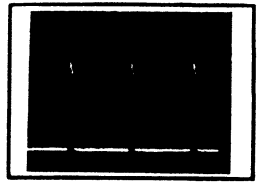
8. 2V/DIV, 10μs/DIV



9. 0.2V/DIV, 10μs/DIV



10. 20V/DIV, 20μs/DIV



EVF BOARD

IC1	NJM2048MC		D2
IC2	AN2510S		A5
Q1	2SB837-CD		C2
Q2	2SD1083		D4
Q3	2SB709A-QR	[B]	C4
D1	EK14		C2
D2	MA151K	[MH]	D4
D3	EM1Z		D4
D4	ES01F		D5

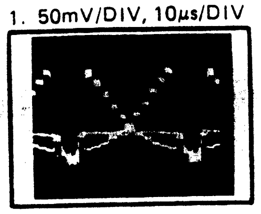
EVF VIC BOARD

IC1	NJM3414M		B2, B3
Q1	2SD601-QR	[Y]	B2
Q2	2SD601-QR	[Y]	A3
Q3	2SC2404-CD	[U]	B2
Q4	2SD601-QR	[Y]	B2
Q5	2SC2404-CD	[U]	B2
Q6	2SC2404-CD	[U]	B2
Q7	2SD601-QR	[Y]	B3
Q8	2SA1022-C	[E]	A3
Q9	2SA1022-C	[E]	A3

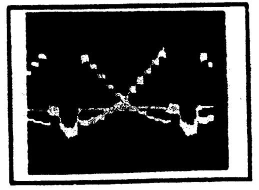
AUTOFOCUS BOARD

IC1	M51265FP		D4
IC2	M51090FP		D7
IC3	MN1554CVR		B6, B7
IC4	NJU4053BM		C2
IC5	NJU4053BM		C3
IC6	M5233FP		B2, B3
IC7	NJM3414M		A5, B4
IC8	M5234FP		B4, B5
IC9	NJM3414M		E7, E8
IC10	M51951AMLW		A8
Q1	2SB709-Q	[A]	C4
Q2	2SD601-QR	[Y]	C4
Q3	2SB709-Q	[A]	C5
Q4	2SD601-QR	[Y]	C5
Q5	2SB709-Q	[A]	C5
Q6	2SD601-QR	[Y]	C5
Q7	2SD601-QR	[Y]	E6
Q8	2SD601-QR	[Y]	C8
Q9	2SB709-Q	[A]	C8
Q10	2SB709-Q	[A]	D8
Q11	2SB709-Q	[A]	D8
Q12	2SC3138TPR	[NO]	E8
Q13	2SA1255TPR	[OO]	E8
Q14	2SD601-QR	[Y]	B2
Q15	2SD601-QR	[Y]	E6
D1	MA151K	[MH]	E3
D2	MA151K	[MH]	C3
D3	MA153	[MC]	C5
D4	MA158	[M1C]	E8
D5	MA151K	[MH]	E8
D6	MA158	[M1C]	E8

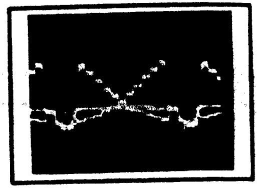
1. 50mV/DIV, 10µs/DIV



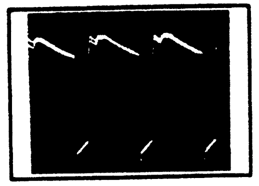
2. 0.2V/DIV, 10µs/DIV



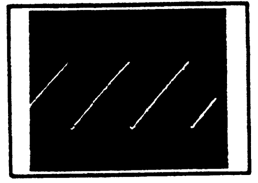
3. 0.2V/DIV, 10µs/DIV



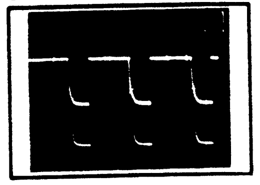
4. 0.2V/DIV, 5ms/DIV



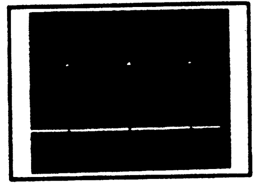
5. 1V/DIV, 20µs/DIV



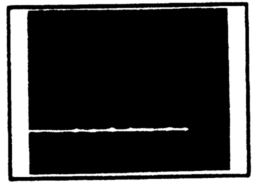
6. 1V/DIV, 20µs/DIV



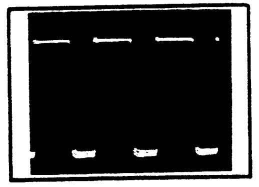
7. 1V/DIV, 20µs/DIV



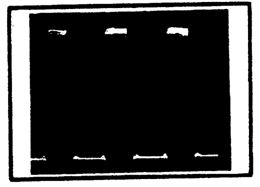
8. 1V/DIV, 10ms/DIV



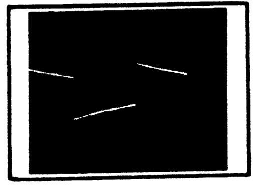
9. 0.2V/DIV, 20µs/DIV



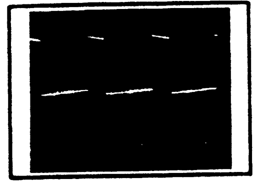
10. 0.1V/DIV, 20µs/DIV



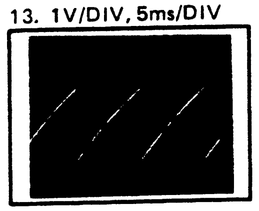
11. 2V/DIV, 10ms/DIV



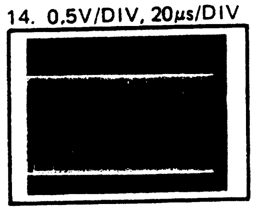
12. 0.5V/DIV, 5ms/DIV



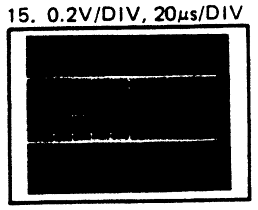
13. 1V/DIV, 5ms/DIV



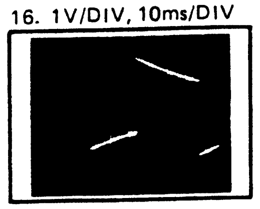
14. 0.5V/DIV, 20µs/DIV



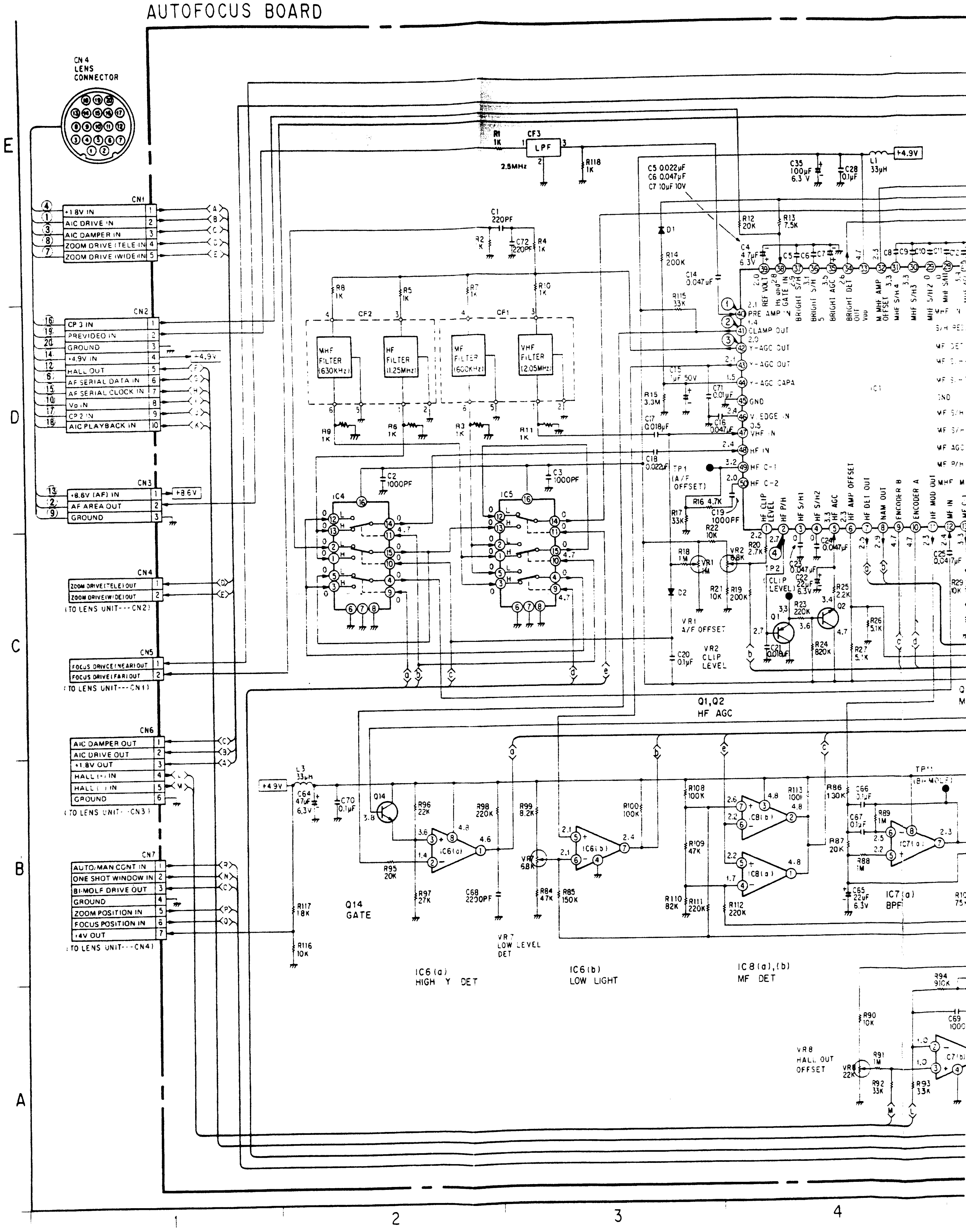
15. 0.2V/DIV, 20µs/DIV



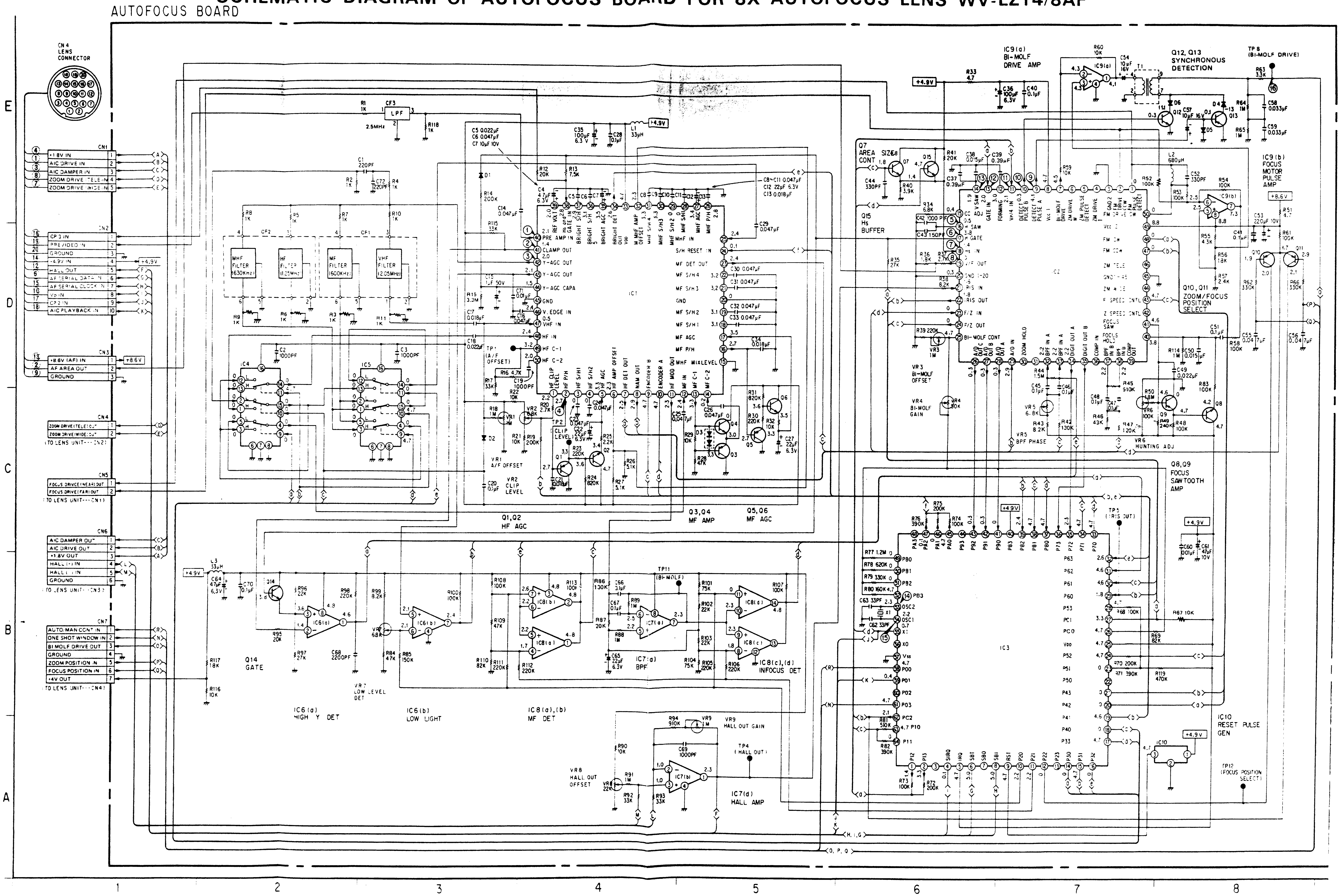
16. 1V/DIV, 10ms/DIV



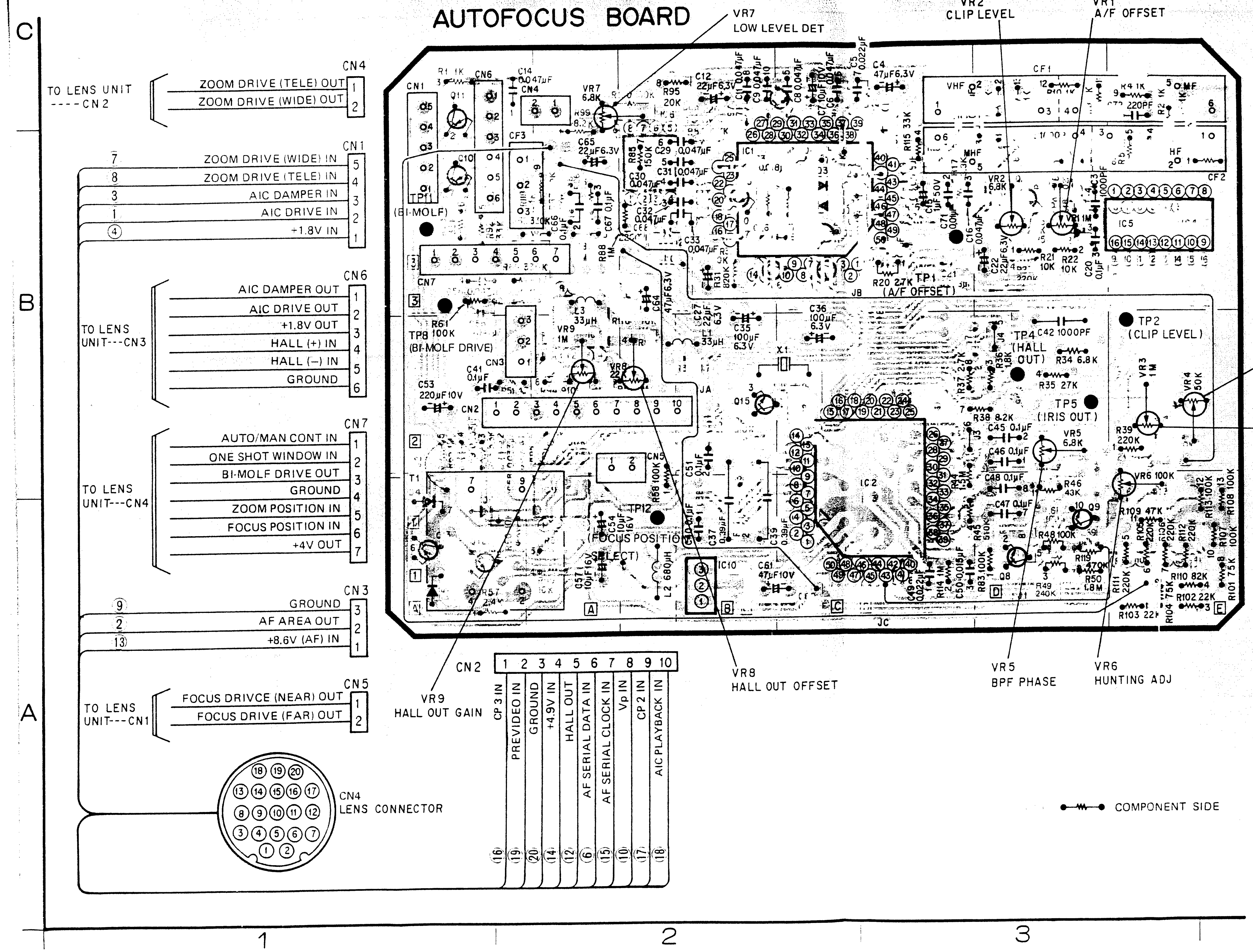
SCHEMATIC DIAGRAM OF AUTOFOCUS BOARD F


AUTOFOCUS BOARD
CN4 LENS CONNECTOR
CN1
+1.8V IN
AIC DRIVE IN
AIC DAMPER IN
ZOOM DRIVE (TELE) IN
ZOOM DRIVE (WIDE) IN
CN2
CP 3 IN
PREVIDEO IN
GROUND
+4.9V IN
HALL OUT
AF SERIAL DATA IN
AF SERIAL CLOCK IN
Vb IN
CP 2 IN
AIC PLAYBACK IN
+4.9V
CN3
+8.6V (AF) IN
AF AREA OUT
GROUND
+8.6V
CN4
ZOOM DRIVE (TELE) OUT
ZOOM DRIVE (WIDE) OUT
(TO LENS UNIT---CN2)
CN5
FOCUS DRIVCE (NEAR) OUT
FOCUS DRIVE (FAR) OUT
(TO LENS UNIT---CN1)
CN6
AIC DAMPER OUT
AIC DRIVE OUT
+1.8V OUT
HALL (+) IN
HALL (-) IN
GROUND
(TO LENS UNIT---CN3)
CN7
AUTO/MAN CONT IN
ONE SHOT WINDOW IN
BI-MOLF DRIVE OUT
GROUND
ZOOM POSITION IN
FOCUS POSITION IN
+4V OUT
(TO LENS UNIT---CN4)
CF3 LPF
2.5MHz
CF2
CF1
MHF FILTER (630KHz)
HF FILTER (1.25MHz)
MF FILTER (650KHz)
VHF FILTER (2.05MHz)
IC4
IC5
IC1
VR1 A/F OFFSET
VR2 CLIP LEVEL
Q1,Q2 HF AGC
Q14 GATE
VR7 LOW LEVEL DET
IC6(a) HIGH Y DET
IC6(b) LOW LIGHT
IC8(a),(b) MF DET
IC7(a) BPF
VR8 HALL OUT OFFSET
A
B
C
D
E
1
2
3
4

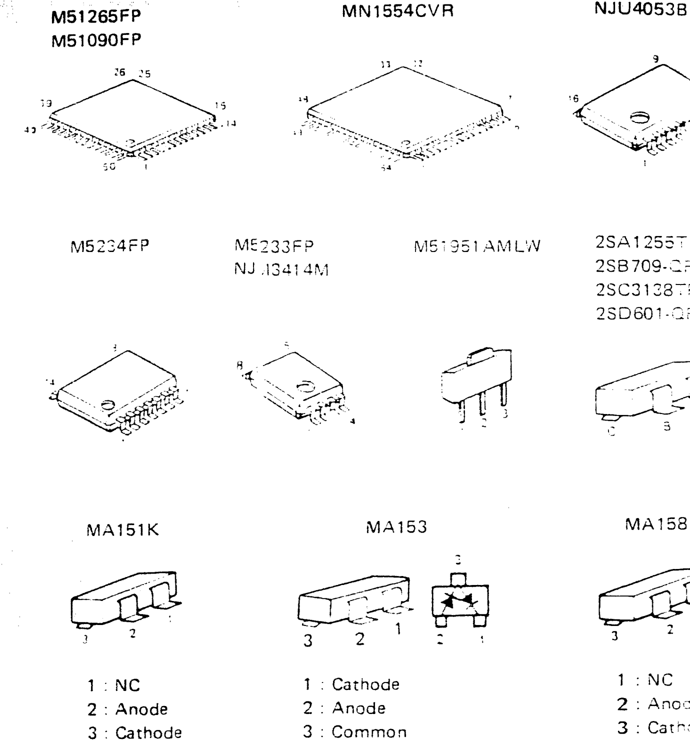
SCHEMATIC DIAGRAM OF AUTOFOCUS BOARD FOR 8X AUTOFOCUS LENS WV-LZ14/8AF


AUTOFOCUS BOARD
CN4 LENS CONNECTOR
CN1
+1.8V IN
A/C DRIVE IN
A/C DAMPER IN
ZOOM DRIVE (TELE) IN
ZOOM DRIVE (WIDE) IN
CN2
CP3 IN
PRE VIDEO IN
GROUND
+4.9V IN
HALL OUT
AF SERIAL DATA IN
AF SERIAL CLOCK IN
VD IN
CP2 IN
A/C PLAYBACK IN
CN3
+8.6V (AF) IN
AF AREA OUT
GROUND
CN4
ZOOM DRIVE(TELE)OUT
ZOOM DRIVE(WIDE)OUT
(TO LENS UNIT---CN2)
CN5
FOCUS DRIVE(NEAR)OUT
FOCUS DRIVE(FAR)OUT
(TO LENS UNIT---CN1)
CN6
A/C DAMPER OUT
A/C DRIVE OUT
+1.8V OUT
HALL (+) IN
HALL (-) IN
GROUND
(TO LENS UNIT---CN3)
CN7
AUTO/MAN CONT IN
ONE SHOT WINDOW IN
BI MOLF DRIVE OUT
GROUND
ZOOM POSITION IN
FOCUS POSITION IN
+4V OUT
(TO LENS UNIT---CN4)
CF3 LPF 2.5MHz
CF2
CF1
MHF FILTER (630KHz)
HF FILTER (1.25MHz)
MF FILTER (600KHz)
VHF FILTER (1.25MHz)
IC4
IC5
IC1
TP1 (A/F OFFSET)
VR1 A/F OFFSET
VR2 CLIP LEVEL
TP2 CLIP LEVEL
Q1,Q2 HF AGC
Q3,Q4 MF AMP
Q5,Q6 MF AGC
IC9(a) BI-MOLF DRIVE AMP
Q12, Q13 SYNCHRONOUS DETECTION
TP8 (BI-MOLF DRIVE)
Q7 AREA SIZE CONT
Q15 Hs BUFFER
IC9(b) FOCUS MOTOR PULSE AMP
IC2
VR3 BI-MOLF OFFSET
VR4 BI-MOLF GAIN
VR5 BPF PHASE
VR6 HUNTING ADJ
Q10,Q11 ZOOM/FOCUS POSITION SELECT
Q8,Q9 FOCUS SAWTOOTH AMP
TP5 (IRIS OUT)
IC3
IC10 RESET PULSE GEN
TP12 (FOCUS POSITION SELECT)
Q14 GATE
IC6(a) HIGH Y DET
IC6(b) LOW LIGHT
VR7 LOW LEVEL DET
IC8(a),(b) MF DET
TP11 (BI-MOLF)
IC7(a) BPF
IC8(c),(d) INFOCUS DET
VR9 HALL OUT GAIN
TP4 (HALL OUT)
VR8 HALL OUT OFFSET
IC7(b)
IC7(d) HALL AMP
+4.9V
+8.6V
A
B
C
D
E
1
2
3
4
5
6
7
8

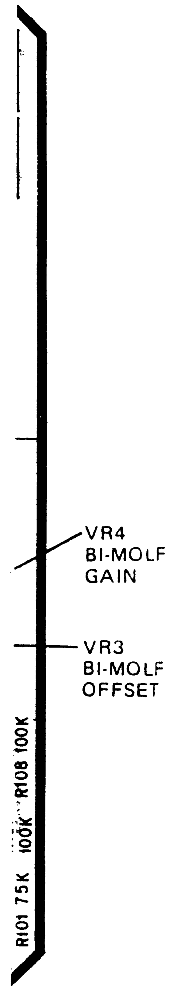
CONDUCTOR VIEW OF AUTOFOCUS BOARD FOR 8X AUTOFOCUS LENS WV-LZ14/8AF


AUTOFOCUS BOARD
C
B
A
1
2
3
TO LENS UNIT ----CN2
CN4
ZOOM DRIVE (TELE) OUT 1
ZOOM DRIVE (WIDE) OUT 2
CN1
7 ZOOM DRIVE (WIDE) IN 5
8 ZOOM DRIVE (TELE) IN 4
3 AIC DAMPER IN 3
1 AIC DRIVE IN 2
④ +1.8V IN 1
CN6
TO LENS UNIT---CN3
AIC DAMPER OUT 1
AIC DRIVE OUT 2
+1.8V OUT 3
HALL (+) IN 4
HALL (–) IN 5
GROUND 6
CN7
TO LENS UNIT---CN4
AUTO/MAN CONT IN 1
ONE SHOT WINDOW IN 2
BI-MOLF DRIVE OUT 3
GROUND 4
ZOOM POSITION IN 5
FOCUS POSITION IN 6
+4V OUT 7
CN3
⑨ GROUND 3
② AF AREA OUT 2
⑬ +8.6V (AF) IN 1
CN5
TO LENS UNIT---CN1
FOCUS DRIVCE (NEAR) OUT 1
FOCUS DRIVE (FAR) OUT 2
CN4 LENS CONNECTOR
⑱⑲⑳
⑬⑭⑮⑯⑰
⑧⑨⑩⑪⑫
③④⑤⑥⑦
①②
CN2 1 2 3 4 5 6 7 8 9 10
CP 3 IN ⑯
PREVIDEO IN ⑲
GROUND ⑳
+4.9V IN ⑭
HALL OUT ⑫
AF SERIAL DATA IN ⑥
AF SERIAL CLOCK IN ⑮
Vp IN ⑩
CP 2 IN ⑰
AIC PLAYBACK IN ⑱
VR7 LOW LEVEL DET
VR2 CLIP LEVEL
VR1 A/F OFFSET
VR4 BI-MOLF GAIN
VR3 BI-MOLF OFFSET
VR9 HALL OUT GAIN
VR8 HALL OUT OFFSET
VR5 BPF PHASE
VR6 HUNTING ADJ
TP1 (A/F OFFSET)
TP2 (CLIP LEVEL)
TP4 (HALL OUT)
TP5 (IRIS OUT)
TP8 (BI-MOLF DRIVE)
TP11 (BI-MOLF)
TP12 (FOCUS POSITION SELECT)
IC1
IC2
IC5
IC10
CF1
CF2
CF3
X1
JA
JB
JC
COMPONENT SIDE

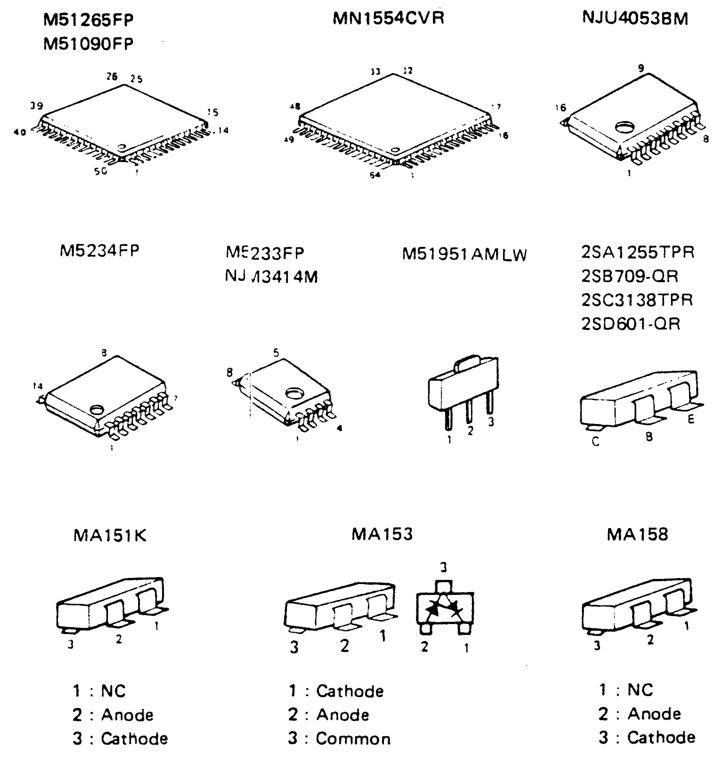
AUTOFOCUS BOARD


M51265FP
M51090FP
MN1554CVR
NJU4053B
M5234FP
M5233FP
NJM3414M
M51951AMLW
2SA1255T
2SB709-Q
2SC3138T
2SD601-Q
MA151K
1 : NC
2 : Anode
3 : Cathode
MA153
1 : Cathode
2 : Anode
3 : Common
MA158
1 : NC
2 : Anod
3 : Cath

IC1	M51265FP		B2
IC2	M51090FP		B3
IC3	MN1554CVR		B3
IC4	NJU4053BM		B3
IC5	NJU4053BM		B3
IC6	M5233FP		B2
IC7	NJM3414M		B2
IC8	M5234FP		A3
IC9	NJM3414M		B2
IC10	M51951AMLW		A2
Q1	2SB709-Q	[A]	B3
Q2	2SD601-QR	[Y]	B3
Q3	2SB709-Q	[A]	B2
Q4	2SD601-QR	[Y]	B2
Q5	2SB709-Q	[A]	B2
Q6	2SD601-QR	[Y]	B2
Q7	2SD601-QR	[Y]	B3
Q8	2SD601-QR	[Y]	A3
Q9	2SB709-Q	[A]	A3
Q10	2SB709-Q	[A]	B1
Q11	2SB709-Q	[A]	C1
Q12	2SC3138TPR	[NC]	A1
Q13	2SA1255TPR	[OC]	A1
Q14	2SD601-QR	[Y]	C2
Q15	2SD601-QR	[Y]	B2
D1	MA151K	[MH]	B3
D2	MA151K	[MH]	B3
D3	MA153	[MC]	B2
D4	MA158	[illegible]	A1
D5	MA151K	[MH]	A1
D6	MA158	[illegible]	A1

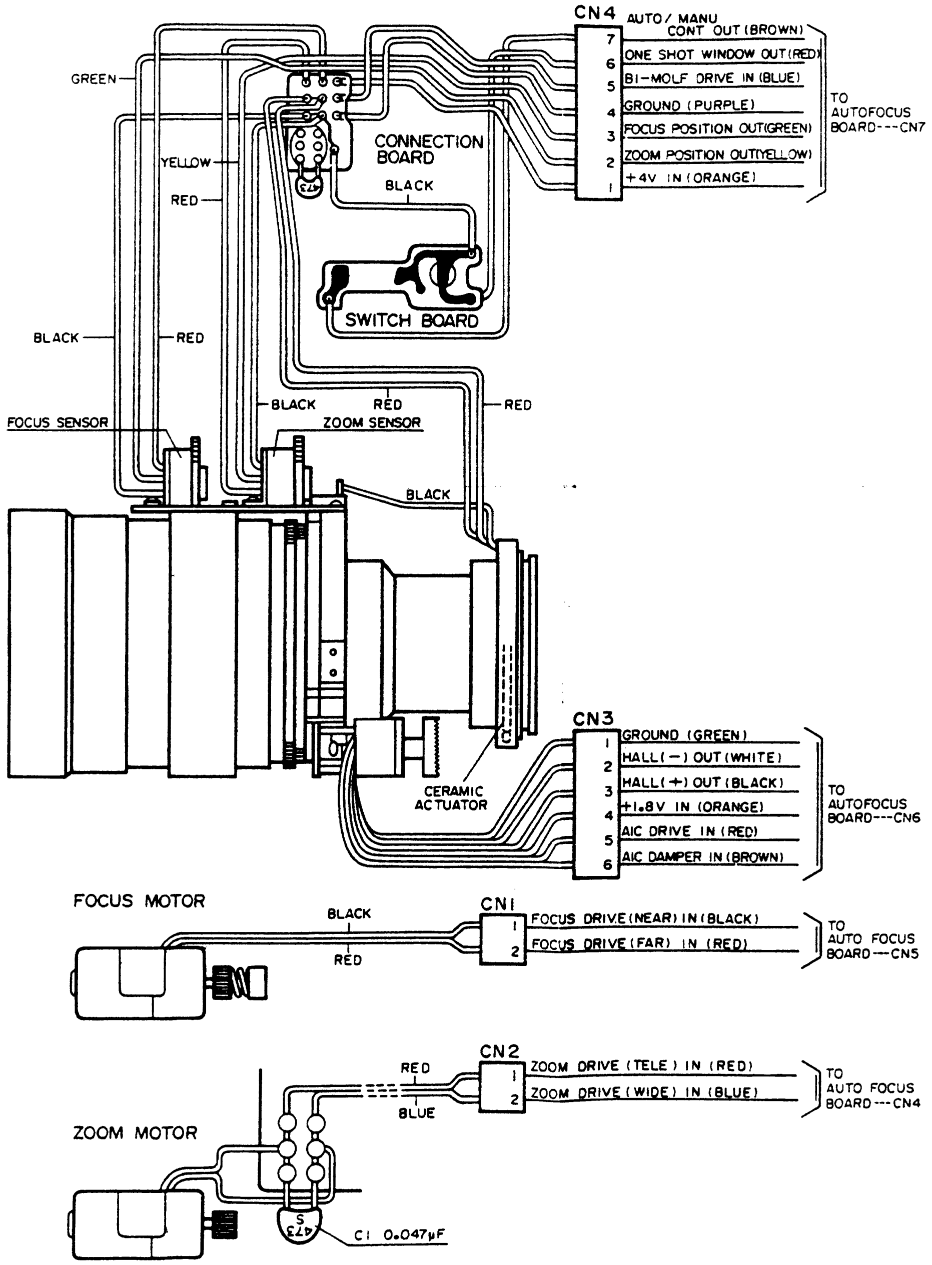

VR4
BI-MOLF
GAIN
VR3
BI-MOLF
OFFSET
R101 75K
R108 100K
100K

AUTOFOCUS BOARD

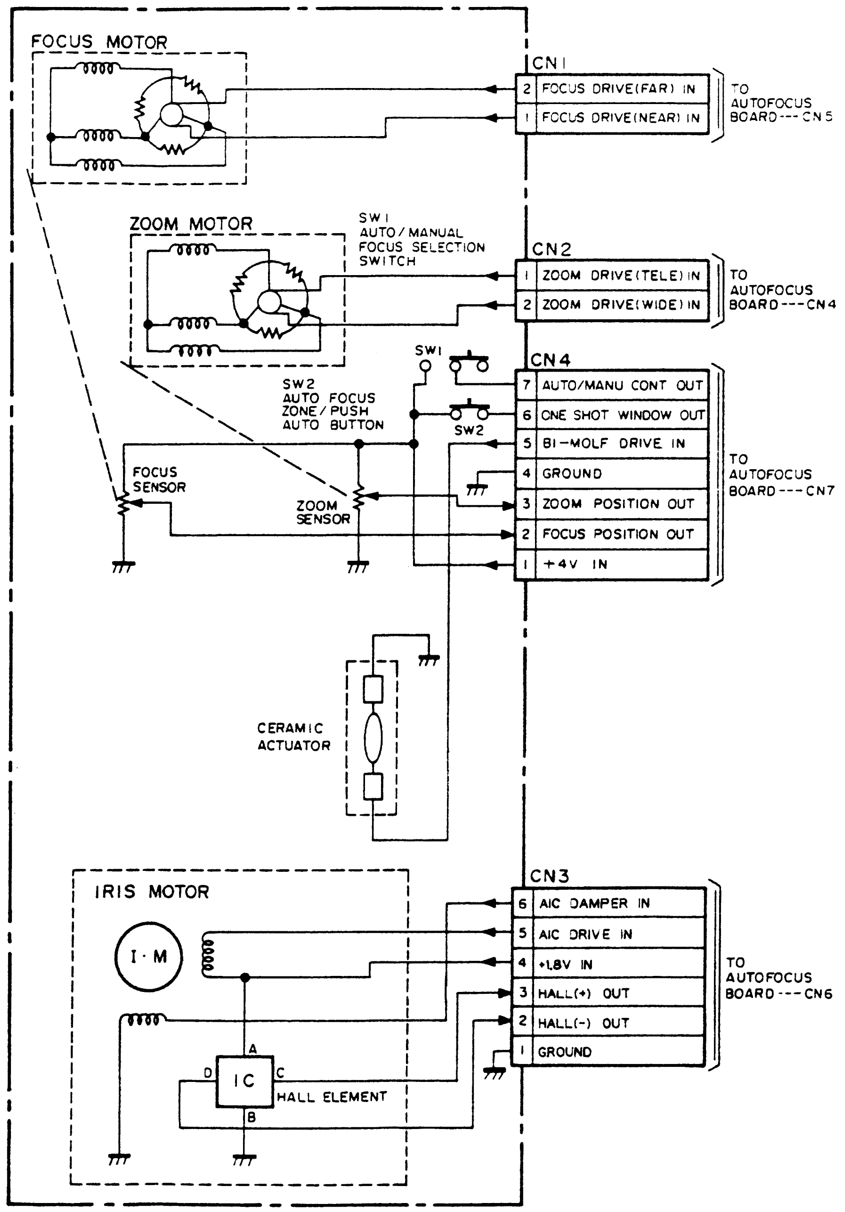

M51265FP
M51090FP
26 25
39
40
15
14
50
1
MN1554CVR
33 32
48
49
17
16
64
1
NJU4053BM
9
16
8
1
M5234FP
8
14
7
1
M5233FP
NJM3414M
5
8
4
1
M51951AMLW
1 2 3
2SA1255TPR
2SB709-QR
2SC3138TPR
2SD601-QR
C
B
E
MA151K
3 2 1
1 : NC
2 : Anode
3 : Cathode
MA153
3
3 2 1
2 1
1 : Cathode
2 : Anode
3 : Common
MA158
3 2 1
1 : NC
2 : Anode
3 : Cathode

IC1	M51265FP		B2
IC2	M51090FP		B3
IC3	MN1554CVR		B3
IC4	NJU4053BM		B3
IC5	NJU4053BM		B3
IC6	M5233FP		B2
IC7	NJM3414M		B2
IC8	M5234FP		A3
IC9	NJM3414M		B2
IC10	M51951AMLW		A2
Q1	2SB709-Q	[A]	B3
Q2	2SD601-QR	[Y]	B3
Q3	2SB709-Q	[A]	B2
Q4	2SD601-QR	[Y]	B2
Q5	2SB709-Q	[A]	B2
Q6	2SD601-QR	[Y]	B2
Q7	2SD601-QR	[Y]	B3
Q8	2SD601-QR	[Y]	A3
Q9	2SB709-Q	[A]	A3
Q10	2SB709-Q	[A]	B1
Q11	2SB709-Q	[A]	C1
Q12	2SC3138TPR	[NC]	A1
Q13	2SA1255TPR	[OC]	A1
Q14	2SD601-QR	[Y]	C2
Q15	2SD601-QR	[Y]	B2
D1	MA151K	[MH]	B3
D2	MA151K	[MH]	B3
D3	MA153	[MC]	B2
D4	MA158	[M1C]	A1
D5	MA151K	[MH]	A1
D6	MA158	[M1C]	A1

WIRING DIAGRAM OF AUTOFOCUS LENS WV-LZ14/8AF


CN4
AUTO/ MANU CONT OUT (BROWN)
7
ONE SHOT WINDOW OUT (RED)
6
BI-MOLF DRIVE IN (BLUE)
5
GROUND (PURPLE)
4
FOCUS POSITION OUT(GREEN)
3
ZOOM POSITION OUT(YELLOW)
2
+4V IN (ORANGE)
1
TO AUTOFOCUS BOARD---CN7
GREEN
YELLOW
RED
CONNECTION BOARD
BLACK
SWITCH BOARD
BLACK
RED
FOCUS SENSOR
BLACK
RED
ZOOM SENSOR
RED
BLACK
CERAMIC ACTUATOR
CN3
GROUND (GREEN)
1
HALL(−) OUT (WHITE)
2
HALL(+) OUT (BLACK)
3
+1.8V IN (ORANGE)
4
AIC DRIVE IN (RED)
5
AIC DAMPER IN (BROWN)
6
TO AUTOFOCUS BOARD---CN6
FOCUS MOTOR
BLACK
RED
CN1
1
FOCUS DRIVE(NEAR) IN (BLACK)
2
FOCUS DRIVE(FAR) IN (RED)
TO AUTO FOCUS BOARD---CN5
ZOOM MOTOR
RED
BLUE
CN2
1
ZOOM DRIVE (TELE) IN (RED)
2
ZOOM DRIVE (WIDE) IN (BLUE)
TO AUTO FOCUS BOARD---CN4
473
C1 0.047μF

SCHEMATIC DIAGRAM OF AUTOFOCUS LENS WV-LZ14/8AF


FOCUS MOTOR
CN1
2 FOCUS DRIVE(FAR) IN
1 FOCUS DRIVE(NEAR) IN
TO AUTOFOCUS BOARD---CN5
ZOOM MOTOR
SW1
AUTO/MANUAL FOCUS SELECTION SWITCH
CN2
1 ZOOM DRIVE(TELE) IN
2 ZOOM DRIVE(WIDE) IN
TO AUTOFOCUS BOARD---CN4
SW1
SW2
AUTO FOCUS ZONE/PUSH AUTO BUTTON
SW2
CN4
7 AUTO/MANU CONT OUT
6 ONE SHOT WINDOW OUT
5 BI-MOLF DRIVE IN
4 GROUND
3 ZOOM POSITION OUT
2 FOCUS POSITION OUT
1 +4V IN
TO AUTOFOCUS BOARD---CN7
FOCUS SENSOR
ZOOM SENSOR
CERAMIC ACTUATOR
IRIS MOTOR
I·M
A
D
IC
C
HALL ELEMENT
B
CN3
6 AIC DAMPER IN
5 AIC DRIVE IN
4 +1.8V IN
3 HALL(+) OUT
2 HALL(−) OUT
1 GROUND
TO AUTOFOCUS BOARD---CN6

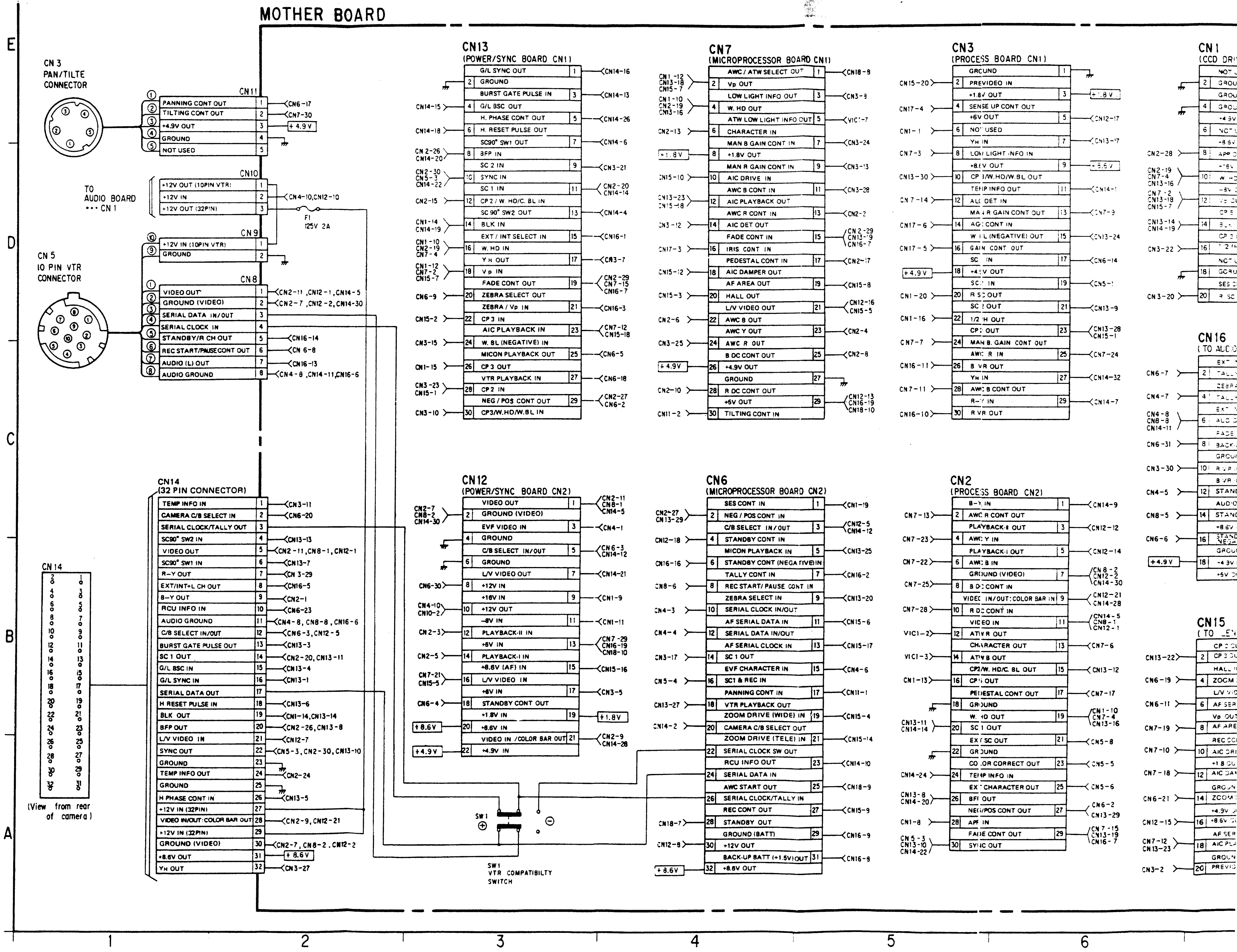
ATW VIC-1

IC1	YFM5223FP	D9
IC2	YFM5223FP	D9
IC3	YFM5223FP	D9

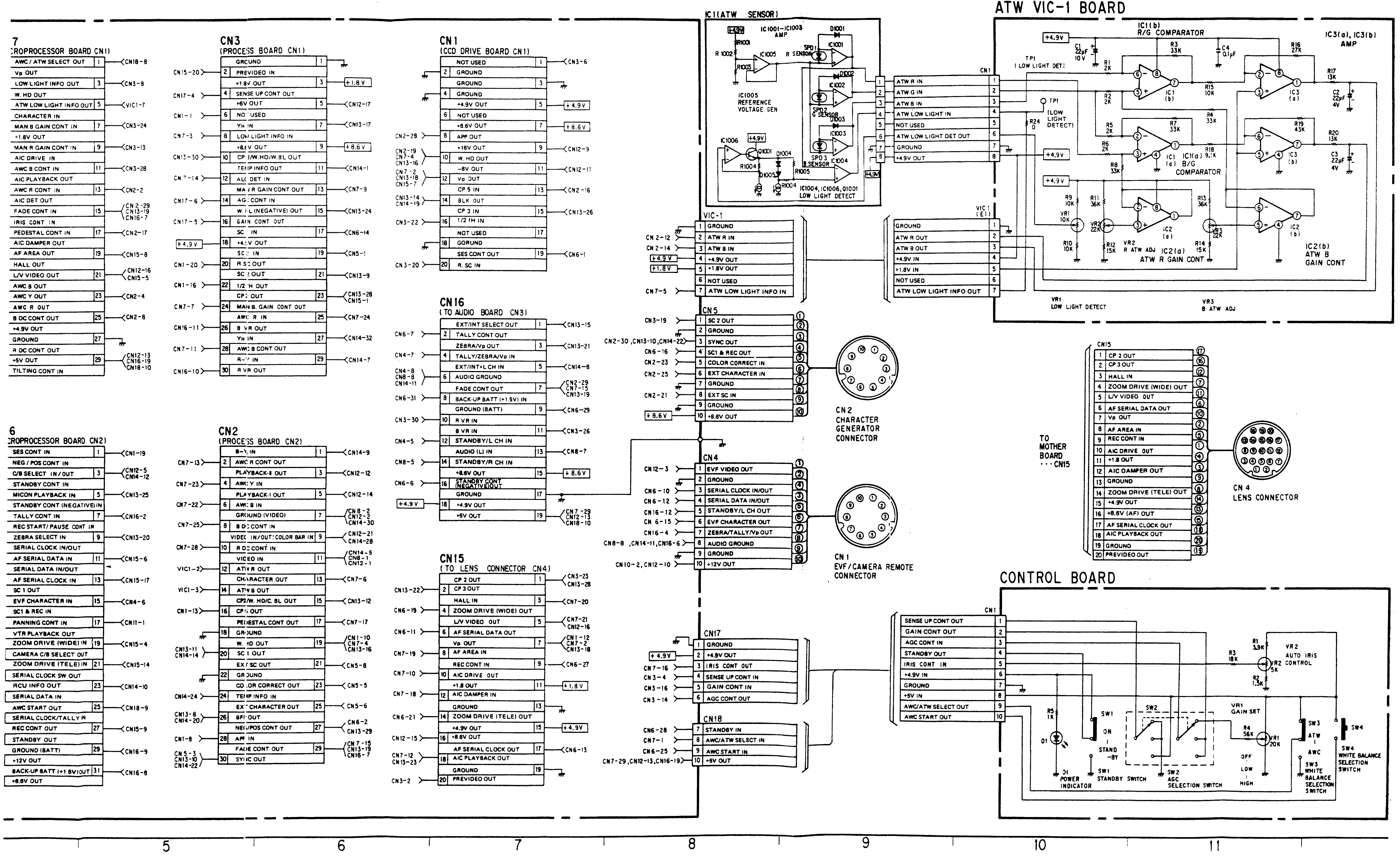
CONTROL BOARD

D1	LN26RP	A10

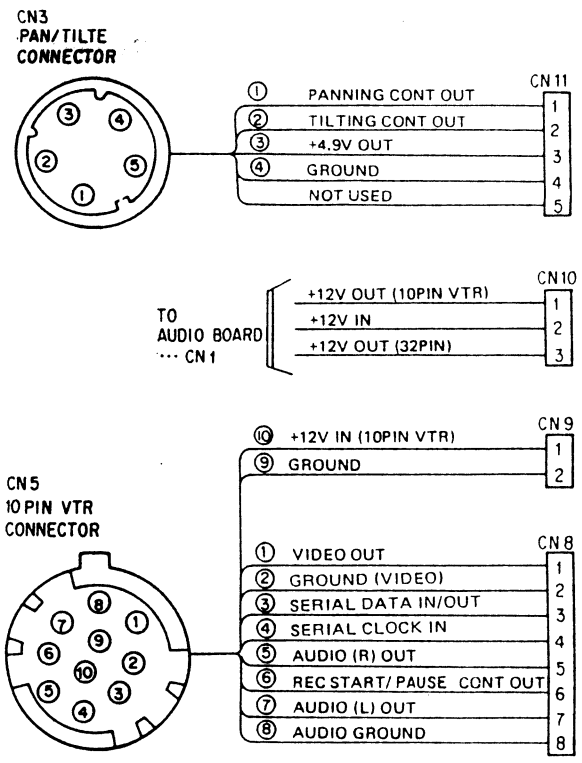
SCHEMATIC DIAGRAM OF MOTHER BOARD


MOTHER BOARD
E
D
C
B
A
1
2
3
4
5
6
CN 3 PAN/TILTE CONNECTOR
CN11
PANNING CONT OUT
TILTING CONT OUT
+4.9V OUT
GROUND
NOT USED
+4.9V
TO AUDIO BOARD ••• CN 1
CN10
+12V OUT (10PIN VTR)
+12V IN
+12V OUT (32PIN)
F1 125V 2A
CN9
+12V IN (10PIN VTR)
GROUND
CN 5 10 PIN VTR CONNECTOR
CN8
VIDEO OUT
GROUND (VIDEO)
SERIAL DATA IN/OUT
SERIAL CLOCK IN
STANDBY/R CH OUT
REC START/PAUSE CONT OUT
AUDIO (L) OUT
AUDIO GROUND
CN14 (32 PIN CONNECTOR)
TEMP INFO IN
CAMERA C/B SELECT IN
SERIAL CLOCK/TALLY OUT
SC90° SW2 IN
VIDEO OUT
SC90° SW1 IN
R-Y OUT
EXT/INT+L CH OUT
B-Y OUT
RCU INFO IN
AUDIO GROUND
C/B SELECT IN/OUT
BURST GATE PULSE OUT
SC 1 OUT
G/L BSC IN
G/L SYNC IN
SERIAL DATA OUT
H RESET PULSE IN
BLK OUT
BFP OUT
L/V VIDEO IN
SYNC OUT
GROUND
TEMP INFO OUT
GROUND
H PHASE CONT IN
+12V IN (32PIN)
VIDEO IN/OUT: COLOR BAR OUT
+12V IN (32PIN)
GROUND (VIDEO)
+8.6V OUT
YH OUT
+8.6V
CN 14
(View from rear of camera)
CN13 (POWER/SYNC BOARD CN1)
G/L SYNC OUT
GROUND
BURST GATE PULSE IN
G/L BSC OUT
H. PHASE CONT OUT
H. RESET PULSE OUT
SC90° SW1 OUT
BFP IN
SC 2 IN
SYNC IN
SC 1 IN
CP 2 / W. HD/C. BL IN
SC 90° SW2 OUT
BLK IN
EXT / INT SELECT IN
W. HD IN
Y H OUT
Vp IN
FADE CONT OUT
ZEBRA SELECT OUT
ZEBRA / Vp IN
CP 3 IN
AIC PLAYBACK IN
W. BL (NEGATIVE) IN
MICON PLAYBACK OUT
CP 3 OUT
VTR PLAYBACK IN
CP 2 IN
NEG / POS CONT OUT
CP3/W.HD/W.BL IN
CN7 (MICROPROCESSOR BOARD CN1)
AWC / ATW SELECT OUT
Vp OUT
LOW LIGHT INFO OUT
W. HD OUT
ATW LOW LIGHT INFO OUT
CHARACTER IN
MAN B GAIN CONT IN
+1.8V OUT
MAN R GAIN CONT IN
AIC DRIVE IN
AWC B CONT IN
AIC PLAYBACK OUT
AWC R CONT IN
AIC DET OUT
FADE CONT IN
IRIS CONT IN
PEDESTAL CONT IN
AIC DAMPER OUT
AF AREA OUT
HALL OUT
L/V VIDEO OUT
AWC B OUT
AWC Y OUT
AWC R OUT
B DC CONT OUT
+4.9V OUT
GROUND
R DC CONT OUT
+5V OUT
TILTING CONT IN
+1.8V
+4.9V
CN3 (PROCESS BOARD CN1)
GROUND
PREVIDEO IN
+1.8V OUT
SENSE UP CONT OUT
+6V OUT
NOT USED
YH IN
LOW LIGHT INFO IN
+8.6V OUT
CP 3/W.HD/W.BL OUT
TEMP INFO OUT
ALC DET IN
MAN R GAIN CONT OUT
AGC CONT IN
W. BL (NEGATIVE) OUT
GAIN CONT OUT
SC IN
+4.9V OUT
SC IN
R SC OUT
SC OUT
1/2 H OUT
CP OUT
MAN B. GAIN CONT OUT
AWC R IN
B VR OUT
YH IN
AWC B CONT OUT
R-Y IN
R VR OUT
+1.8V
+5.6V
+4.9V
CN1 (CCD DRI
CN16 (TO AUDIO
CN15 (TO LEN
+4.9V
CN12 (POWER/SYNC BOARD CN2)
VIDEO OUT
GROUND (VIDEO)
EVF VIDEO IN
GROUND
C/B SELECT IN/OUT
GROUND
L/V VIDEO OUT
+12V IN
+16V IN
+12V OUT
-8V IN
PLAYBACK-II IN
+6V IN
PLAYBACK-I IN
+8.6V (AF) IN
L/V VIDEO IN
+6V IN
STANDBY CONT OUT
+1.8V IN
+8.6V IN
VIDEO IN / COLOR BAR OUT
+4.9V IN
+1.8V
+8.6V
+4.9V
SW 1 VTR COMPATIBILTY SWITCH
CN6 (MICROPROCESSOR BOARD CN2)
SES CONT IN
NEG / POS CONT IN
C/B SELECT IN/OUT
STANDBY CONT IN
MICON PLAYBACK IN
STANDBY CONT (NEGATIVE) IN
TALLY CONT IN
REC START/ PAUSE CONT IN
ZEBRA SELECT IN
SERIAL CLOCK IN/OUT
AF SERIAL DATA IN
SERIAL DATA IN/OUT
AF SERIAL CLOCK IN
SC 1 OUT
EVF CHARACTER IN
SC1 & REC IN
PANNING CONT IN
VTR PLAYBACK OUT
ZOOM DRIVE (WIDE) IN
CAMERA C/B SELECT OUT
ZOOM DRIVE (TELE) IN
SERIAL CLOCK SW OUT
RCU INFO OUT
SERIAL DATA IN
AWC START OUT
SERIAL CLOCK/TALLY IN
REC CONT OUT
STANDBY OUT
GROUND (BATT)
+12V OUT
BACK-UP BATT (+1.5V) OUT
+8.6V OUT
+8.6V
CN2 (PROCESS BOARD CN2)
B-Y IN
AWC R CONT OUT
PLAYBACK-II OUT
AWC Y IN
PLAYBACK-I OUT
AWC B IN
GROUND (VIDEO)
B DC CONT IN
VIDEO IN/OUT: COLOR BAR IN
R DC CONT IN
VIDEO IN
ATW R OUT
CHARACTER OUT
ATW B OUT
CP2/W. HD/C. BL OUT
CP OUT
PEDESTAL CONT OUT
GROUND
W. HD OUT
SC 1 OUT
EXT SC OUT
GROUND
COLOR CORRECT OUT
TEMP INFO IN
EXT CHARACTER OUT
BFP OUT
NEG/POS CONT OUT
APF IN
FADE CONT OUT
SYNC OUT

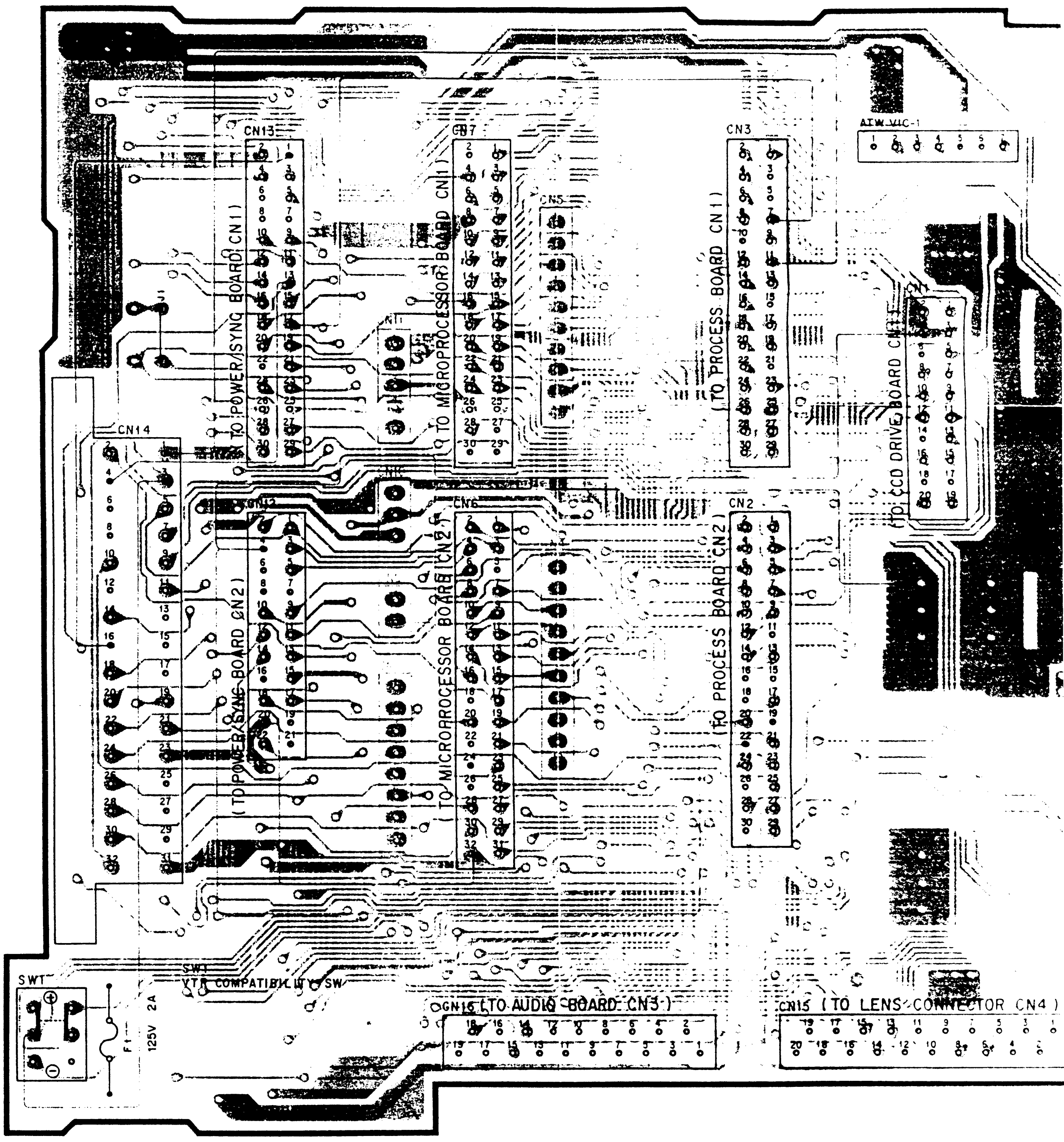
SCHEMATIC DIAGRAM OF MOTHER BOARD


CN3
(PROCESS BOARD CN1)
CN1
(CCD DRIVE BOARD CN1)
CN2
(PROCESS BOARD CN2)
CN16
(TO AUDIO BOARD CN3)
CN15
(TO LENS CONNECTOR CN4)
IC1 (ATW SENSOR)
IC1001–IC1003 AMP
IC1005 REFERENCE VOLTAGE GEN
IC1004, IC1006, Q1001 LOW LIGHT DETECT
SPD1 R SENSOR
SPD2 G SENSOR
SPD3 B SENSOR
ATW VIC-1 BOARD
IC1(b) R/G COMPARATOR
IC3(a), IC3(b) AMP
IC1(a) B/G COMPARATOR
IC2(a) ATW R GAIN CONT
IC2(b) ATW B GAIN CONT
TP1 (LOW LIGHT DET)
VR1 LOW LIGHT DETECT
VR2 R ATW ADJ
VR3 B ATW ADJ
VIC-1
CN5
CN2 CHARACTER GENERATOR CONNECTOR
CN4
CN1 EVF/CAMERA REMOTE CONNECTOR
CN15
TO MOTHER BOARD ···CN15
CN 4 LENS CONNECTOR
CN17
CN18
CONTROL BOARD
VR2 AUTO IRIS CONTROL
VR1 GAIN SET
D1 POWER INDICATOR
SW1 STANDBY SWITCH
SW2 AGC SELECTION SWITCH
SW3 WHITE BALANCE SELECTION SWITCH
SW4 WHITE BALANCE SELECTION SWITCH
5
6
7
8
9
10
11

CONDUCTOR VIEW OF


CN3
PAN/TILTE
CONNECTOR
CN11
① PANNING CONT OUT
② TILTING CONT OUT
③ +4.9V OUT
④ GROUND
NOT USED
TO
AUDIO BOARD
···· CN1
CN10
+12V OUT (10PIN VTR)
+12V IN
+12V OUT (32PIN)
CN9
⑩ +12V IN (10PIN VTR)
⑨ GROUND
CN5
10 PIN VTR
CONNECTOR
CN8
① VIDEO OUT
② GROUND (VIDEO)
③ SERIAL DATA IN/OUT
④ SERIAL CLOCK IN
⑤ AUDIO (R) OUT
⑥ REC START/PAUSE CONT OUT
⑦ AUDIO (L) OUT
⑧ AUDIO GROUND
D
C
B

MOTHER BOARD


CN13
(TO POWER/SYNC BOARD CN1)
CN7
(TO MICROPROCESSOR BOARD CN1)
CN5
CN3
(TO PROCESS BOARD CN1)
ATW VIC-1
CN1
(TO CCD DRIVE BOARD CN1)
J1
CN14
CN12
(TO POWER/SYNC BOARD CN2)
CN6
(TO MICROPROCESSOR BOARD CN2)
CN2
(TO PROCESS BOARD CN2)
SW1
SW1 VTR COMPATIBILITY SW
F1
125V 2A
CN16 (TO AUDIO BOARD CN3)
CN15 (TO LENS CONNECTOR CN4)

CN14 (32PIN CONNECTOR)

2	CAMERA C/B SELECT IN	1	TEMP INFO IN
4	SC90° SW2 IN	3	SERIAL CLOCK/TALLY OUT
6	SC90° SW1 IN	5	VIDEO OUT
8	EXT/INT+L CH OUT	7	R-Y OUT
10	RCU INFO IN	9	B-Y OUT
12	C/B SELECT IN/OUT	11	AUDIO GROUND
14	SC 1 OUT	13	BURST GATE PULSE OUT
16	G/L SYNC IN	15	G/L BSC IN
18	H RESET PULSE IN	17	SERIAL DATA OUT
20	BFP OUT	19	BLK OUT
22	SYNC OUT	21	L/V VIDEO IN
24	TEMP INFO OUT	23	GROUND
26	H PHASE CONT IN	25	GROUND
28	VIDEO OUT/COLOR BAR OUT	27	+12V IN (32PIN)
30	GROUND (VIDEO)	29	+12V IN (32PIN)
32	YH OUT	31	+8.6V OUT

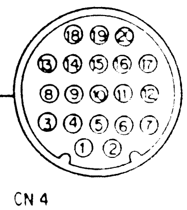
A

COMPONENT SIDE

PATTERN SIDE

1	CP 2 OUT	⑰	2	CP 3 OUT	⑯
3	HALL IN	⑫	4	ZOOM DRIVE (WIDE) OUT	⑦
5	L/V VIDEO OUT	⑪	6	AF SERIAL DATA OUT	⑥
7	Vp OUT	⑩	8	AF AREA IN	②
9	REC CONT IN	⑤	10	AIC DRIVE OUT	①
11	+1.8 OUT	④	12	AIC DAMPER OUT	③
13	GROUND	⑨	14	ZOOM DRIVE (TELE) OUT	⑧
15	+4.9V OUT	⑭	16	+8.6V (AF) OUT	⑬
17	AF SERIAL CLOCK OUT	⑮	18	AIC PLAYBACK OUT	⑱
19	GROUND	⑳	20	PREVIDEO OUT	⑲

CN15 (TO LENS CONNECTOR ····· CN4)



CN4
LENS CONNECTOR

1 2 3 4

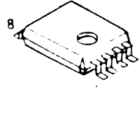
ATW VIC-1 BOARD

IC1	M5223FP	D8
IC2	M5223FP	C8
IC3	M5223FP	D8

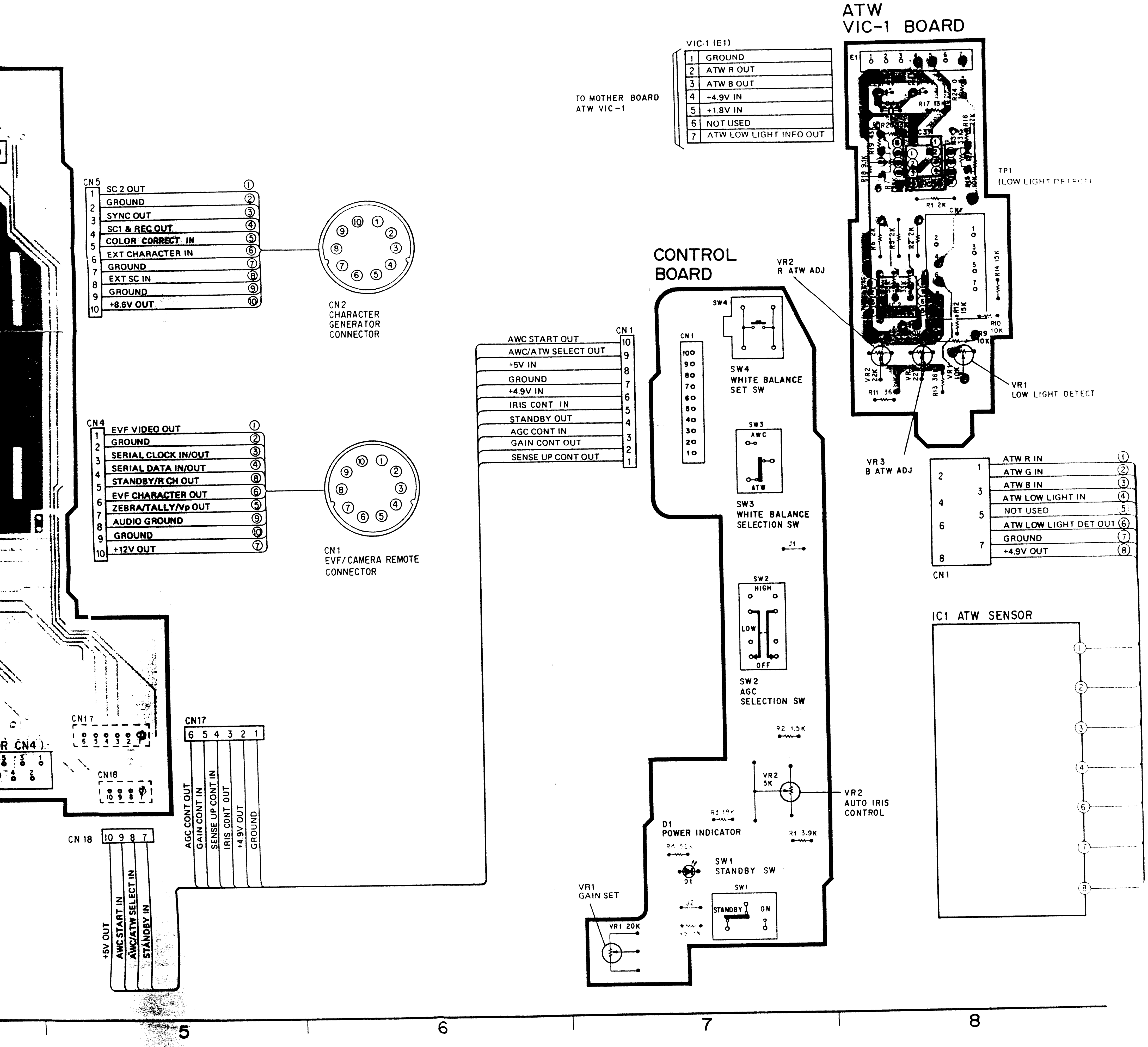
CONTROL BOARD

D1	LN26RP	A7

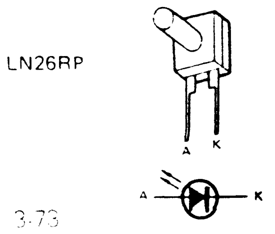
M5223FP



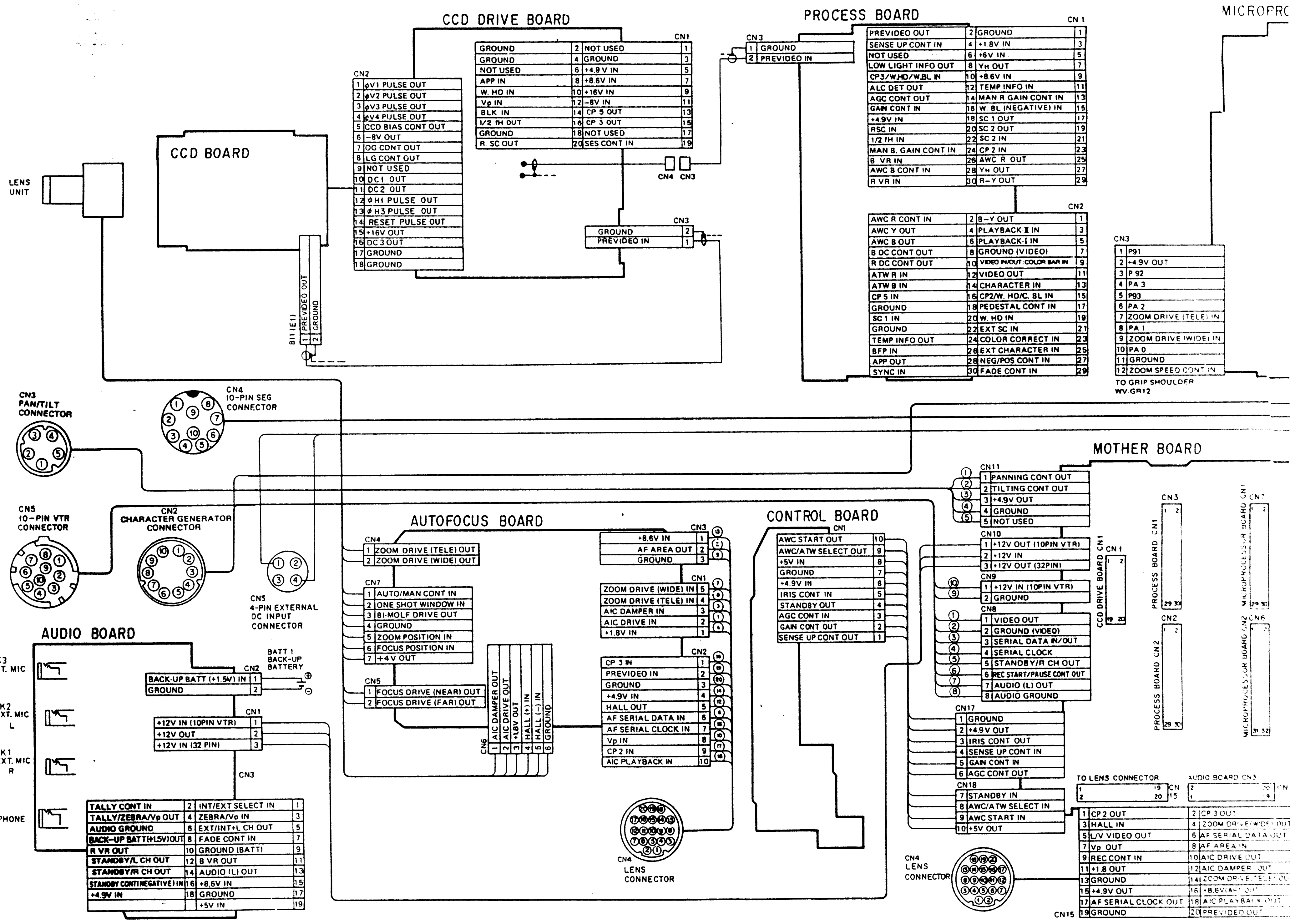
OF MOTHER BOARD



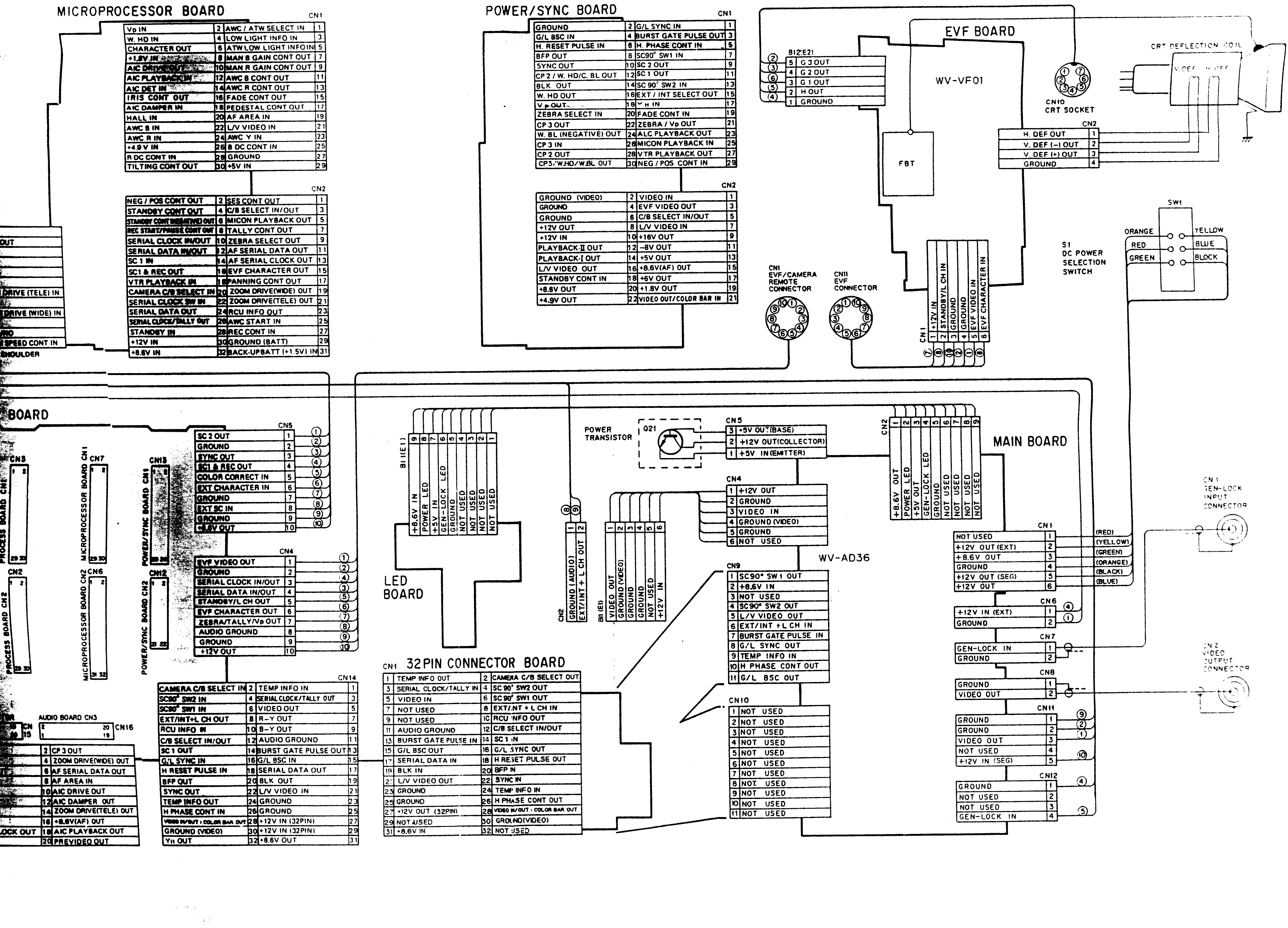
ATW
VIC-1 BOARD
VIC-1 (E1)
1 GROUND
2 ATW R OUT
3 ATW B OUT
4 +4.9V IN
5 +1.8V IN
6 NOT USED
7 ATW LOW LIGHT INFO OUT
TO MOTHER BOARD
ATW VIC-1
E1
R17 13K
R18 9.1K
R1 2K
R14 15K
R12 15K
R10 10K
R9 10K
R11 36
R13 36
TP1
(LOW LIGHT DETECT)
VR2
R ATW ADJ
VR1
LOW LIGHT DETECT
VR3
B ATW ADJ
CN1
1 ATW R IN
2 ATW G IN
3 ATW B IN
4 ATW LOW LIGHT IN
5 NOT USED
6 ATW LOW LIGHT DET OUT
7 GROUND
8 +4.9V OUT
IC1 ATW SENSOR
CONTROL
BOARD
SW4
WHITE BALANCE
SET SW
SW3
AWC
ATW
SW3
WHITE BALANCE
SELECTION SW
J1
SW2
HIGH
LOW
OFF
SW2
AGC
SELECTION SW
R2 1.5K
VR2
5K
VR2
AUTO IRIS
CONTROL
R3 18K
D1
POWER INDICATOR
R1 3.9K
SW1
STANDBY SW
STANDBY
ON
VR1
GAIN SET
VR1 20K
CN1
10 AWC START OUT
9 AWC/ATW SELECT OUT
8 +5V IN
7 GROUND
6 +4.9V IN
5 IRIS CONT IN
4 STANDBY OUT
3 AGC CONT IN
2 GAIN CONT OUT
1 SENSE UP CONT OUT
CN5
1 SC 2 OUT
2 GROUND
3 SYNC OUT
4 SC1 & REC OUT
5 COLOR CORRECT IN
6 EXT CHARACTER IN
7 GROUND
8 EXT SC IN
9 GROUND
10 +8.6V OUT
CN2
CHARACTER
GENERATOR
CONNECTOR
CN4
1 EVF VIDEO OUT
2 GROUND
3 SERIAL CLOCK IN/OUT
4 SERIAL DATA IN/OUT
5 STANDBY/R CH OUT
6 EVF CHARACTER OUT
7 ZEBRA/TALLY/Vp OUT
8 AUDIO GROUND
9 GROUND
10 +12V OUT
CN1
EVF/CAMERA REMOTE
CONNECTOR
CN17
6 5 4 3 2 1
AGC CONT OUT
GAIN CONT IN
SENSE UP CONT IN
IRIS CONT OUT
+4.9V OUT
GROUND
CN 18
10 9 8 7
+5V OUT
AWC START IN
AWC/ATW SELECT IN
STANDBY IN
CN18
R CN4
5
6
7
8



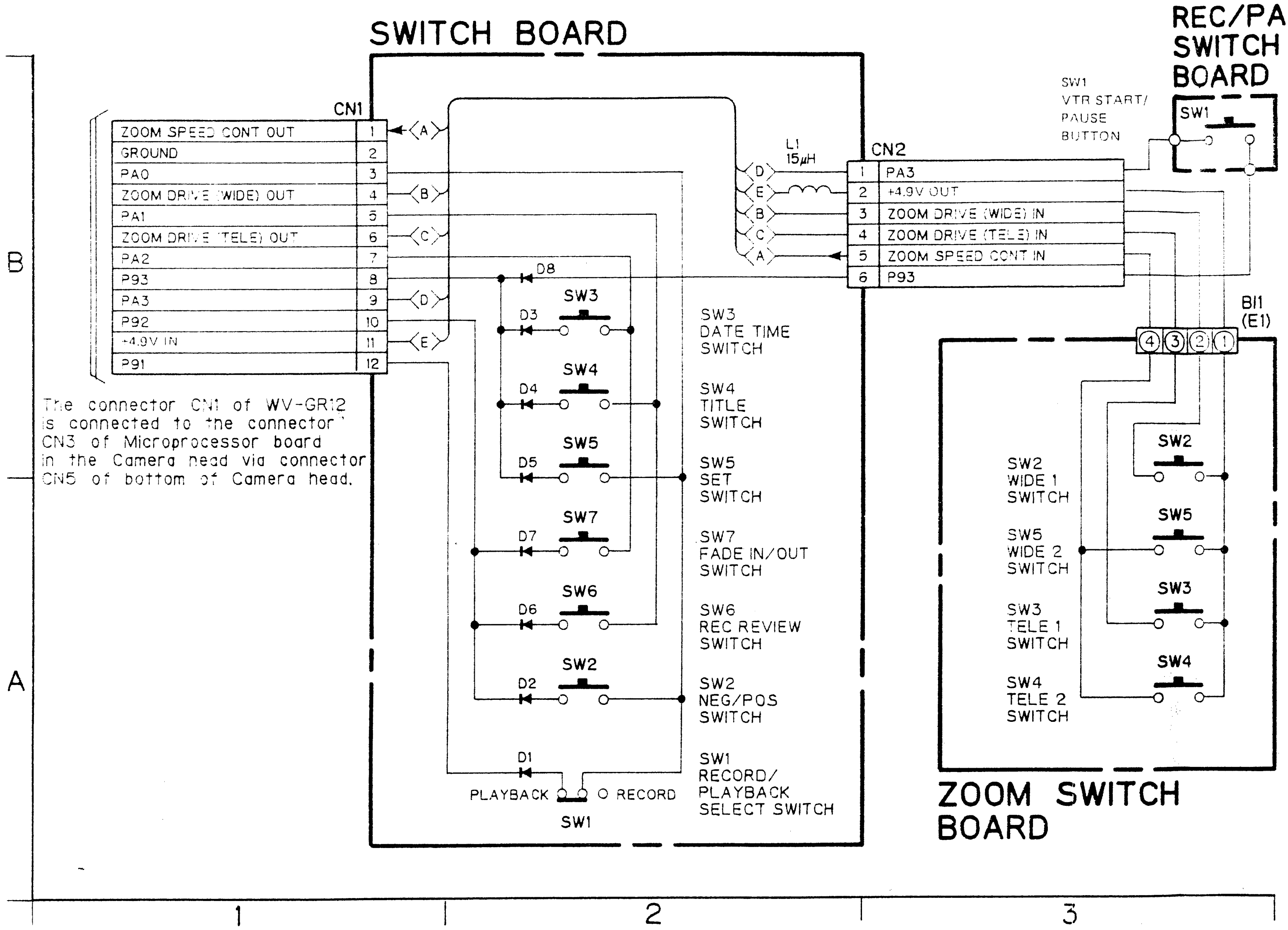
WIRING DIAGRAM


CCD DRIVE BOARD
CN1
GROUND 2 NOT USED 1
GROUND 4 GROUND 3
NOT USED 6 +4.9 V IN 5
APP IN 8 +8.6V IN 7
W. HD IN 10 +16V IN 9
Vp IN 12 −8V IN 11
BLK IN 14 CP 5 OUT 13
1/2 fH OUT 16 CP 3 OUT 15
GROUND 18 NOT USED 17
R. SC OUT 20 SES CONT IN 19
CN2
1 φV1 PULSE OUT
2 φV2 PULSE OUT
3 φV3 PULSE OUT
4 φV4 PULSE OUT
5 CCD BIAS CONT OUT
6 −8V OUT
7 OG CONT OUT
8 LG CONT OUT
9 NOT USED
10 DC1 OUT
11 DC2 OUT
12 φH1 PULSE OUT
13 φH3 PULSE OUT
14 RESET PULSE OUT
15 +16V OUT
16 DC3 OUT
17 GROUND
18 GROUND
CN4 CN3
CN3
GROUND 2
PREVIDEO IN 1
CCD BOARD
LENS UNIT
B11 (E1)
1 PREVIDEO OUT
2 GROUND
PROCESS BOARD
CN3
1 GROUND
2 PREVIDEO IN
CN 1
PREVIDEO OUT 2 GROUND 1
SENSE UP CONT IN 4 +1.8V IN 3
NOT USED 6 +6V IN 5
LOW LIGHT INFO OUT 8 YH OUT 7
CP3/W.HD/W.BL IN 10 +8.6V IN 9
ALC DET OUT 12 TEMP INFO IN 11
AGC CONT OUT 14 MAN R GAIN CONT IN 13
GAIN CONT IN 16 W. BL (NEGATIVE) IN 15
+4.9V IN 18 SC 1 OUT 17
RSC IN 20 SC 2 OUT 19
1/2 fH IN 22 SC 2 IN 21
MAN B. GAIN CONT IN 24 CP 2 IN 23
B VR IN 26 AWC R OUT 25
AWC B CONT IN 28 YH OUT 27
R VR IN 30 R−Y OUT 29
CN2
AWC R CONT IN 2 B−Y OUT 1
AWC Y OUT 4 PLAYBACK II IN 3
AWC B OUT 6 PLAYBACK I IN 5
B DC CONT OUT 8 GROUND (VIDEO) 7
R DC CONT OUT 10 VIDEO IN/OUT: COLOR BAR IN 9
ATW R IN 12 VIDEO OUT 11
ATW B IN 14 CHARACTER IN 13
CP 5 IN 16 CP2/W. HD/C. BL IN 15
GROUND 18 PEDESTAL CONT IN 17
SC 1 IN 20 W. HD IN 19
GROUND 22 EXT SC IN 21
TEMP INFO OUT 24 COLOR CORRECT IN 23
BFP IN 26 EXT CHARACTER IN 25
APP OUT 28 NEG/POS CONT IN 27
SYNC IN 30 FADE CONT IN 29
MICROPRC
CN3
1 P91
2 +4.9V OUT
3 P 92
4 PA 3
5 P93
6 PA 2
7 ZOOM DRIVE (TELE) IN
8 PA 1
9 ZOOM DRIVE (WIDE) IN
10 PA 0
11 GROUND
12 ZOOM SPEED CONT IN
TO GRIP SHOULDER WV-GR12
CN3 PAN/TILT CONNECTOR
CN4 10-PIN SEG CONNECTOR
CN5 10-PIN VTR CONNECTOR
CN2 CHARACTER GENERATOR CONNECTOR
CN5 4-PIN EXTERNAL DC INPUT CONNECTOR
AUDIO BOARD
JK3 INT. MIC
JK2 EXT. MIC L
JK1 EXT. MIC R
JK4 EARPHONE
BATT 1 BACK-UP BATTERY
CN2
BACK-UP BATT (+1.5V) IN 1
GROUND 2
CN1
+12V IN (10PIN VTR) 1
+12V OUT 2
+12V IN (32 PIN) 3
CN3
TALLY CONT IN 2 INT/EXT SELECT IN 1
TALLY/ZEBRA/Vp OUT 4 ZEBRA/Vp IN 3
AUDIO GROUND 6 EXT/INT+L CH OUT 5
BACK-UP BATT(+1.5V)OUT 8 FADE CONT IN 7
R VR OUT 10 GROUND (BATT) 9
STANDBY/L CH OUT 12 B VR OUT 11
STANDBY/R CH OUT 14 AUDIO (L) OUT 13
STANDBY CONT(NEGATIVE) IN 16 +8.6V IN 15
+4.9V IN 18 GROUND 17
+5V IN 19
AUTOFOCUS BOARD
CN4
1 ZOOM DRIVE (TELE) OUT
2 ZOOM DRIVE (WIDE) OUT
CN7
1 AUTO/MAN CONT IN
2 ONE SHOT WINDOW IN
3 BI-MOLF DRIVE OUT
4 GROUND
5 ZOOM POSITION IN
6 FOCUS POSITION IN
7 +4V OUT
CN5
1 FOCUS DRIVE (NEAR) OUT
2 FOCUS DRIVE (FAR) OUT
CN6
1 AIC DAMPER OUT
2 AIC DRIVE OUT
3 +1.8V OUT
4 HALL (+) IN
5 HALL (−) IN
6 GROUND
CN3
+8.6V IN 1
AF AREA OUT 2
GROUND 3
CN1
ZOOM DRIVE (WIDE) IN 5
ZOOM DRIVE (TELE) IN 4
AIC DAMPER IN 3
AIC DRIVE IN 2
+1.8V IN 1
CN2
CP 3 IN 1
PREVIDEO IN 2
GROUND 3
+4.9V IN 4
HALL OUT 5
AF SERIAL DATA IN 6
AF SERIAL CLOCK IN 7
Vp IN 8
CP 2 IN 9
AIC PLAYBACK IN 10
CN4 LENS CONNECTOR
CONTROL BOARD
CN1
AWC START OUT 10
AWC/ATW SELECT OUT 9
+5V IN 8
GROUND 7
+4.9V IN 6
IRIS CONT IN 5
STANDBY OUT 4
AGC CONT IN 3
GAIN CONT OUT 2
SENSE UP CONT OUT 1
MOTHER BOARD
CN11
1 PANNING CONT OUT
2 TILTING CONT OUT
3 +4.9V OUT
4 GROUND
5 NOT USED
CN10
1 +12V OUT (10PIN VTR)
2 +12V IN
3 +12V OUT (32PIN)
CN9
1 +12V IN (10PIN VTR)
2 GROUND
CN8
1 VIDEO OUT
2 GROUND (VIDEO)
3 SERIAL DATA IN/OUT
4 SERIAL CLOCK
5 STANDBY/R CH OUT
6 REC START/PAUSE CONT OUT
7 AUDIO (L) OUT
8 AUDIO GROUND
CN17
1 GROUND
2 +4.9V OUT
3 IRIS CONT OUT
4 SENSE UP CONT IN
5 GAIN CONT IN
6 AGC CONT OUT
CN18
7 STANDBY IN
8 AWC/ATW SELECT IN
9 AWC START IN
10 +5V OUT
CCD DRIVE BOARD CN1
CN 1
PROCESS BOARD CN1
CN3
PROCESS BOARD CN2
CN2
MICROPROCESSOR BOARD CN1
CN7
MICROPROCESSOR BOARD CN2
CN6
TO LENS CONNECTOR
CN 15
AUDIO BOARD CN3
CN
CN4 LENS CONNECTOR
CN15
1 CP2 OUT 2 CP 3 OUT
3 HALL IN 4 ZOOM DRIVE(WIDE) OUT
5 L/V VIDEO OUT 6 AF SERIAL DATA OUT
7 Vp OUT 8 AF AREA IN
9 REC CONT IN 10 AIC DRIVE OUT
11 +1.8 OUT 12 AIC DAMPER OUT
13 GROUND 14 ZOOM DRIVE (TELE) OUT
15 +4.9V OUT 16 +8.6V(AF) OUT
17 AF SERIAL CLOCK OUT 18 AIC PLAYBACK OUT
19 GROUND 20 PREVIDEO OUT

IAGRAM OF CAMERA HEAD

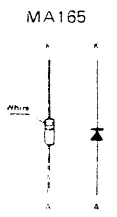

MICROPROCESSOR BOARD
CN1
Vp IN | 2 | AWC / ATW SELECT IN | 1
W. HD IN | 4 | LOW LIGHT INFO IN | 3
CHARACTER OUT | 6 | ATW LOW LIGHT INFO IN | 5
+1.8V IN | 8 | MAN B GAIN CONT OUT | 7
AIC DRIVE OUT | 10 | MAN R GAIN CONT OUT | 9
AIC PLAYBACK IN | 12 | AWC B CONT OUT | 11
AIC DET IN | 14 | AWC R CONT OUT | 13
IRIS CONT OUT | 16 | FADE CONT OUT | 15
AIC DAMPER IN | 18 | PEDESTAL CONT OUT | 17
HALL IN | 20 | AF AREA IN | 19
AWC B IN | 22 | L/V VIDEO IN | 21
AWC R IN | 24 | AWC Y IN | 23
+4.9 V IN | 26 | B DC CONT IN | 25
R DC CONT IN | 28 | GROUND | 27
TILTING CONT OUT | 30 | +5V IN | 29
CN2
NEG / POS CONT OUT | 2 | SES CONT OUT | 1
STANDBY CONT OUT | 4 | C/B SELECT IN/OUT | 3
STANDBY CONT (NEGATIVE) OUT | 6 | MICON PLAYBACK OUT | 5
REC START/PAUSE CONT OUT | 8 | TALLY CONT OUT | 7
SERIAL CLOCK IN/OUT | 10 | ZEBRA SELECT OUT | 9
SERIAL DATA IN/OUT | 12 | AF SERIAL DATA OUT | 11
SC 1 IN | 14 | AF SERIAL CLOCK OUT | 13
SC1 & REC OUT | 16 | EVF CHARACTER OUT | 15
VTR PLAYBACK IN | 18 | PANNING CONT OUT | 17
CAMERA C/B SELECT IN | 20 | ZOOM DRIVE(WIDE) OUT | 19
SERIAL CLOCK SW IN | 22 | ZOOM DRIVE(TELE) OUT | 21
SERIAL DATA OUT | 24 | RCU INFO OUT | 23
SERIAL CLOCK/TALLY OUT | 26 | AWC START IN | 25
STANDBY IN | 28 | REC CONT IN | 27
+12V IN | 30 | GROUND (BATT) | 29
+8.6V IN | 32 | BACK-UP BATT (+1.5V) IN | 31
OUT
DRIVE (TELE) IN
DRIVE (WIDE) IN
SPEED CONT IN
SHOULDER
POWER/SYNC BOARD
CN1
GROUND | 2 | G/L SYNC IN | 1
G/L BSC IN | 4 | BURST GATE PULSE OUT | 3
H. RESET PULSE IN | 6 | H. PHASE CONT IN | 5
BFP OUT | 8 | SC90° SW1 IN | 7
SYNC OUT | 10 | SC 2 OUT | 9
CP 2 / W. HD/C. BL OUT | 12 | SC 1 OUT | 11
BLK OUT | 14 | SC 90° SW2 IN | 13
W. HD OUT | 16 | EXT / INT SELECT OUT | 15
Vp OUT | 18 | V H IN | 17
ZEBRA SELECT IN | 20 | FADE CONT IN | 19
CP 3 OUT | 22 | ZEBRA / Vp OUT | 21
W. BL (NEGATIVE) OUT | 24 | ALC PLAYBACK OUT | 23
CP 3 IN | 26 | MICON PLAYBACK IN | 25
CP 2 OUT | 28 | VTR PLAYBACK OUT | 27
CP3/W.HD/W.BL OUT | 30 | NEG / POS CONT IN | 29
CN2
GROUND (VIDEO) | 2 | VIDEO IN | 1
GROUND | 4 | EVF VIDEO OUT | 3
GROUND | 6 | C/B SELECT IN/OUT | 5
+12V OUT | 8 | L/V VIDEO IN | 7
+12V IN | 10 | +16V OUT | 9
PLAYBACK-II OUT | 12 | -8V OUT | 11
PLAYBACK-I OUT | 14 | +5V OUT | 13
L/V VIDEO OUT | 16 | +8.6V(AF) OUT | 15
STANDBY CONT IN | 18 | +6V OUT | 17
+8.6V OUT | 20 | +1.8V OUT | 19
+4.9V OUT | 22 | VIDEO OUT/COLOR BAR IN | 21
EVF BOARD
WV-VF01
B12(E2)
5 G 3 OUT
4 G 2 OUT
3 G 1 OUT
2 H OUT
1 GROUND
FBT
CN10
CRT SOCKET
CRT DEFLECTION COIL
V. DEF
H. DEF
CN2
H. DEF OUT | 1
V. DEF (−) OUT | 2
V. DEF (+) OUT | 3
GROUND | 4
CN1
1 +12V IN
2 STANDBY/L CH IN
3 GROUND
4 GROUND
5 EVF VIDEO IN
6 EVF CHARACTER IN
CN1
EVF/CAMERA
REMOTE
CONNECTOR
CN11
EVF
CONNECTOR
SW1
ORANGE
RED
GREEN
YELLOW
BLUE
BLOCK
S1
DC POWER
SELECTION
SWITCH
BOARD
CN3
PROCESS BOARD CN1
MICROPROCESSOR BOARD CN1
CN7
CN13
POWER/SYNC BOARD CN1
CN2
PROCESS BOARD CN2
MICROPROCESSOR BOARD CN2
CN6
CN12
POWER/SYNC BOARD CN2
CN5
SC 2 OUT | 1
GROUND | 2
SYNC OUT | 3
SC1 & REC OUT | 4
COLOR CORRECT IN | 5
EXT CHARACTER IN | 6
GROUND | 7
EXT SC IN | 8
GROUND | 9
+8.6V OUT | 10
CN4
EVF VIDEO OUT | 1
GROUND | 2
SERIAL CLOCK IN/OUT | 3
SERIAL DATA IN/OUT | 4
STANDBY/L CH OUT | 5
EVF CHARACTER OUT | 6
ZEBRA/TALLY/Vp OUT | 7
AUDIO GROUND | 8
GROUND | 9
+12V OUT | 10
CN14
CAMERA C/B SELECT IN | 2 | TEMP INFO IN | 1
SC90° SW2 IN | 4 | SERIAL CLOCK/TALLY OUT | 3
SC90° SW1 IN | 6 | VIDEO OUT | 5
EXT/INT+L CH OUT | 8 | R−Y OUT | 7
RCU INFO IN | 10 | B−Y OUT | 9
C/B SELECT IN/OUT | 12 | AUDIO GROUND | 11
SC 1 OUT | 14 | BURST GATE PULSE OUT | 13
G/L SYNC IN | 16 | G/L BSC IN | 15
H RESET PULSE IN | 18 | SERIAL DATA OUT | 17
BFP OUT | 20 | BLK OUT | 19
SYNC OUT | 22 | L/V VIDEO IN | 21
TEMP INFO OUT | 24 | GROUND | 23
H PHASE CONT IN | 26 | GROUND | 25
VIDEO IN/OUT : COLOR BAR OUT | 28 | +12V IN (32PIN) | 27
GROUND (VIDEO) | 30 | +12V IN (32PIN) | 29
Y11 OUT | 32 | +8.6V OUT | 31
AUDIO BOARD CN3
CN15
CN16
2 | CP 3 OUT
4 | ZOOM DRIVE(WIDE) OUT
6 | AF SERIAL DATA OUT
8 | AF AREA IN
10 | AIC DRIVE OUT
12 | AIC DAMPER OUT
14 | ZOOM DRIVE(TELE) OUT
16 | +8.6V(AF) OUT
OCK OUT | 18 | AIC PLAYBACK OUT
20 | PREVIDEO OUT
B11(E1)
9 +8.6V IN
8 POWER LED
7 +5V IN
6 GEN-LOCK LED
5 GROUND
4 NOT USED
3 NOT USED
2 NOT USED
1 NOT USED
LED BOARD
CN2
1 GROUND (AUDIO)
2 EXT/INT + L CH OUT
B11 (E1)
1 VIDEO OUT
2 GROUND (VIDEO)
3 GROUND
4 GROUND
5 NOT USED
6 +12V IN
POWER TRANSISTOR
Q21
CN5
3 | +5V OUT (BASE)
2 | +12V OUT(COLLECTOR)
1 | +5V IN(EMITTER)
CN4
1 | +12V OUT
2 | GROUND
3 | VIDEO IN
4 | GROUND (VIDEO)
5 | GROUND
6 | NOT USED
WV-AD36
CN9
1 | SC90° SW1 OUT
2 | +8.6V IN
3 | NOT USED
4 | SC90° SW2 OUT
5 | L/V VIDEO OUT
6 | EXT/INT +L CH IN
7 | BURST GATE PULSE IN
8 | G/L SYNC OUT
9 | TEMP INFO IN
10 | H PHASE CONT OUT
11 | G/L BSC OUT
CN10
1 | NOT USED
2 | NOT USED
3 | NOT USED
4 | NOT USED
5 | NOT USED
6 | NOT USED
7 | NOT USED
8 | NOT USED
9 | NOT USED
10 | NOT USED
11 | NOT USED
CN1 32PIN CONNECTOR BOARD
1 | TEMP INFO OUT | 2 | CAMERA C/B SELECT OUT
3 | SERIAL CLOCK/TALLY IN | 4 | SC 90° SW2 OUT
5 | VIDEO IN | 6 | SC 90° SW1 OUT
7 | NOT USED | 8 | EXT/INT + L CH IN
9 | NOT USED | 10 | RCU INFO OUT
11 | AUDIO GROUND | 12 | C/B SELECT IN/OUT
13 | BURST GATE PULSE IN | 14 | SC 1 IN
15 | G/L BSC OUT | 16 | G/L SYNC OUT
17 | SERIAL DATA IN | 18 | H RESET PULSE OUT
19 | BLK IN | 20 | BFP IN
21 | L/V VIDEO OUT | 22 | SYNC IN
23 | GROUND | 24 | TEMP INFO IN
25 | GROUND | 26 | H PHASE CONT OUT
27 | +12V OUT (32PIN) | 28 | VIDEO IN/OUT : COLOR BAR OUT
29 | NOT USED | 30 | GROUND(VIDEO)
31 | +8.6V IN | 32 | NOT USED
MAIN BOARD
CN2
1 +8.6V OUT
2 POWER LED
3 +5V OUT
4 GEN-LOCK LED
5 GROUND
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
CN1
NOT USED | 1 | (RED)
+12V OUT (EXT) | 2 | (YELLOW)
+8.6V OUT | 3 | (GREEN)
GROUND | 4 | (ORANGE)
+12V OUT (SEG) | 5 | (BLACK)
+12V OUT | 6 | (BLUE)
CN6
+12V IN (EXT) | 1
GROUND | 2
CN7
GEN-LOCK IN | 1
GROUND | 2
CN8
GROUND | 1
VIDEO OUT | 2
CN11
GROUND | 1
GROUND | 2
VIDEO OUT | 3
NOT USED | 4
+12V IN (SEG) | 5
CN12
GROUND | 1
NOT USED | 2
NOT USED | 3
GEN-LOCK IN | 4
CN1
GEN-LOCK
INPUT
CONNECTOR
CN2
VIDEO
OUTPUT
CONNECTOR

SCHEMATIC DIAGRAM OF GRIP SHOULDER WV-GR12


SWITCH BOARD
CN1
ZOOM SPEED CONT OUT 1
GROUND 2
PA0 3
ZOOM DRIVE (WIDE) OUT 4
PA1 5
ZOOM DRIVE (TELE) OUT 6
PA2 7
P93 8
PA3 9
P92 10
+4.9V IN 11
P91 12
A
B
C
D
E
L1
15μH
CN2
1 PA3
2 +4.9V OUT
3 ZOOM DRIVE (WIDE) IN
4 ZOOM DRIVE (TELE) IN
5 ZOOM SPEED CONT IN
6 P93
D8
D3
SW3
SW3 DATE TIME SWITCH
D4
SW4
SW4 TITLE SWITCH
D5
SW5
SW5 SET SWITCH
D7
SW7
SW7 FADE IN/OUT SWITCH
D6
SW6
SW6 REC REVIEW SWITCH
D2
SW2
SW2 NEG/POS SWITCH
D1
PLAYBACK
RECORD
SW1
SW1 RECORD/ PLAYBACK SELECT SWITCH
REC/PAUSE SWITCH BOARD
SW1 VTR START/ PAUSE BUTTON
SW1
BI1 (E1)
④③②①
SW2
SW2 WIDE 1 SWITCH
SW5
SW5 WIDE 2 SWITCH
SW3
SW3 TELE 1 SWITCH
SW4
SW4 TELE 2 SWITCH
ZOOM SWITCH BOARD
B
A
1
2
3

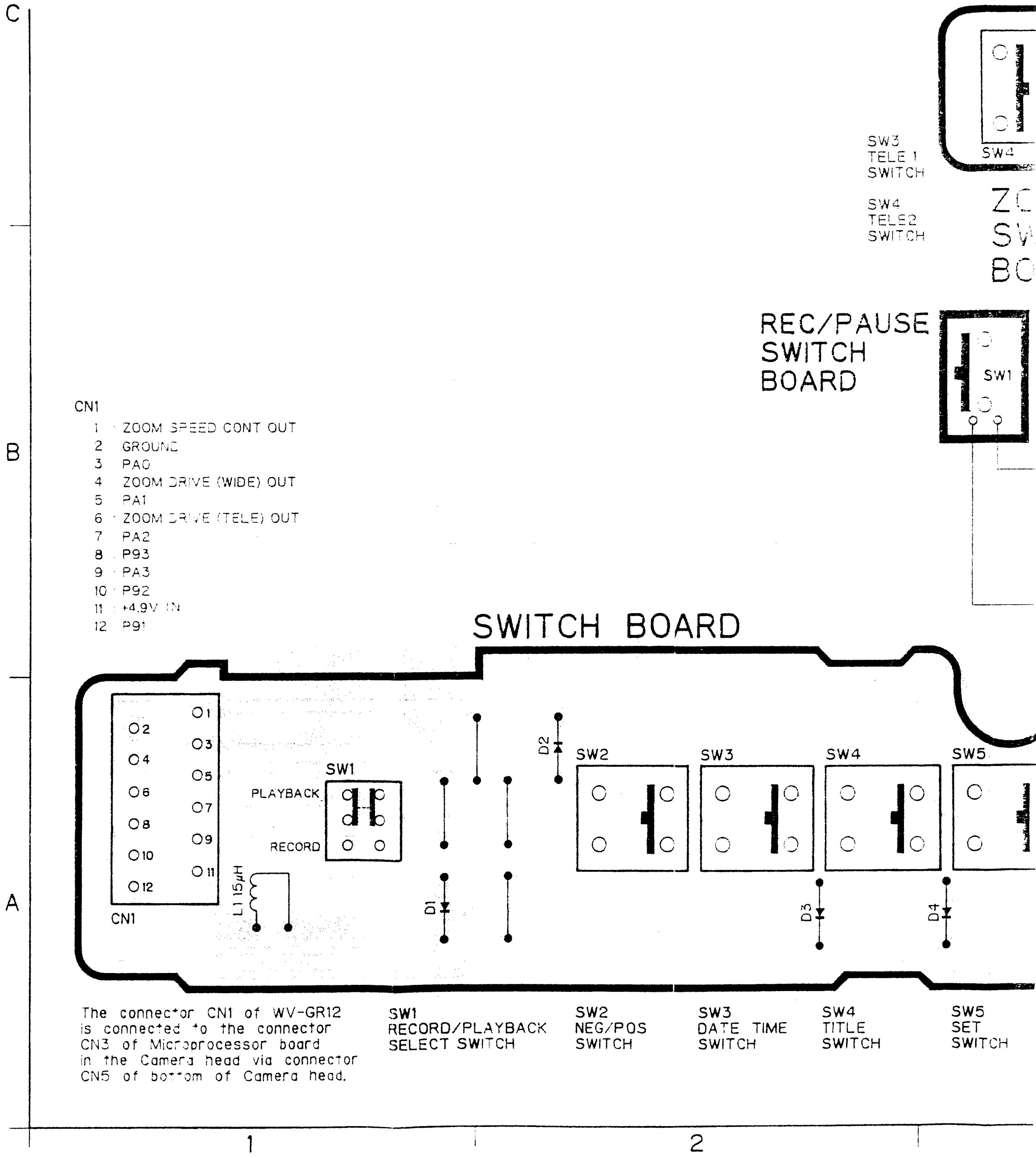
The connector CN1 of WV-GR12 is connected to the connector CN3 of Microprocessor board in the Camera head via connector CN5 of bottom of Camera head.

WV-GR12
SWITCH BOARD



D1	MA165	A2
D2	MA165	A2
D3	MA165	B2
D4	MA165	B2
D5	MA165	B2
D6	MA165	A2
D7	MA165	A2
D8	MA165	B2

CONDUCTOR VIEW OF GRIP SHOULDER WV-GR12

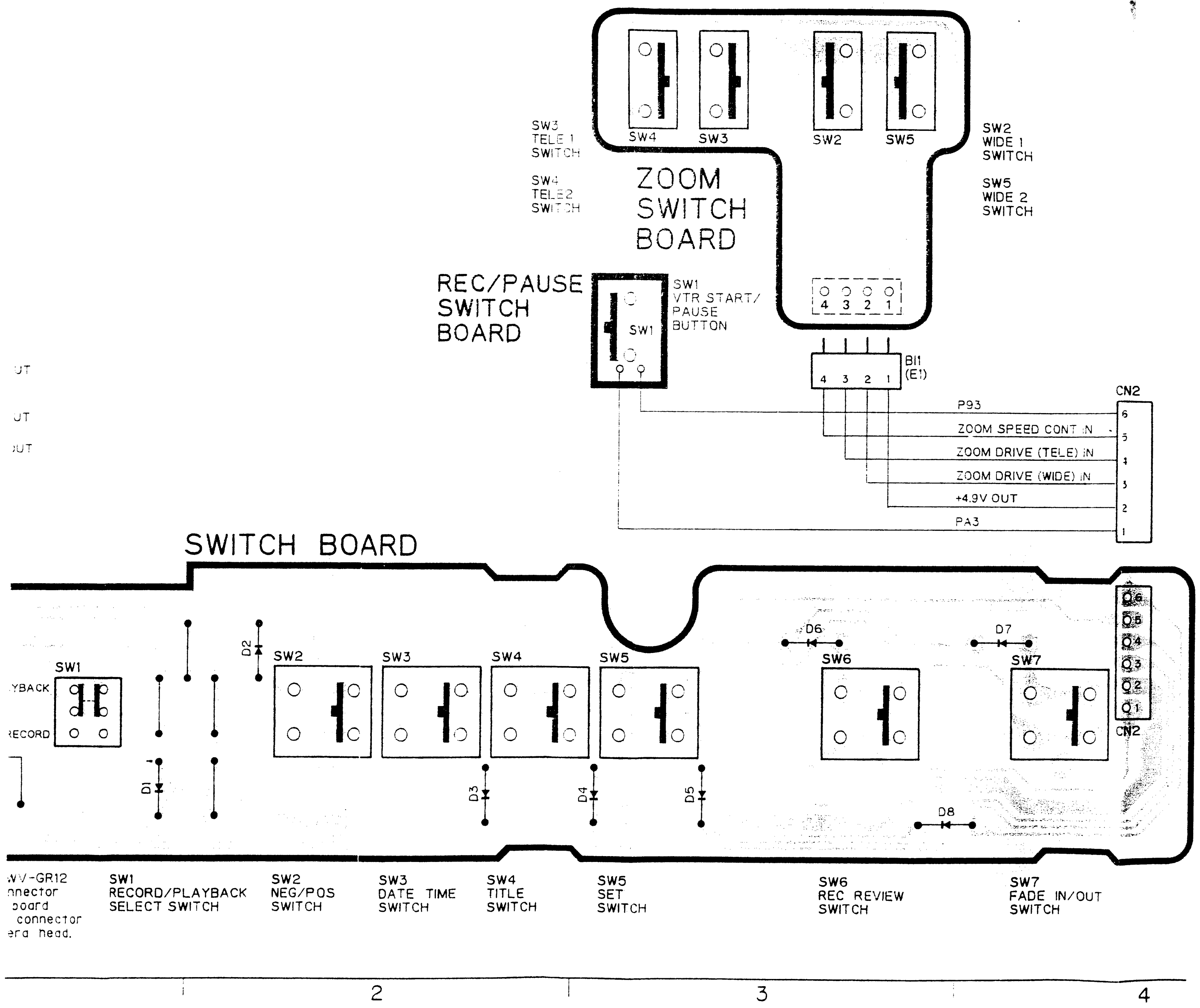

C
B
A
SW3 TELE 1 SWITCH
SW4 TELE2 SWITCH
SW4
REC/PAUSE SWITCH BOARD
SW1
CN1
1 ZOOM SPEED CONT OUT
2 GROUND
3 PA0
4 ZOOM DRIVE (WIDE) OUT
5 PA1
6 ZOOM DRIVE (TELE) OUT
7 PA2
8 P93
9 PA3
10 P92
11 +4.9V IN
12 P91
SWITCH BOARD
1 2 3 4 5 6 7 8 9 10 11 12
CN1
SW1
PLAYBACK
RECORD
L1 15μH
D1
D2
SW2
SW3
SW4
SW5
D3
D4
SW1 RECORD/PLAYBACK SELECT SWITCH
SW2 NEG/POS SWITCH
SW3 DATE TIME SWITCH
SW4 TITLE SWITCH
SW5 SET SWITCH
1
2

The connector CN1 of WV-GR12 is connected to the connector CN3 of Microprocessor board in the Camera head via connector CN5 of bottom of Camera head.

WV-GR12 SWITCH BOARD

D1	MA165	A1
D2	MA165	A2
D3	MA165	A2
D4	MA165	A3
D5	MA165	A3
D6	MA165	A3
D7	MA165	A4
[illegible]	[illegible]	[illegible]

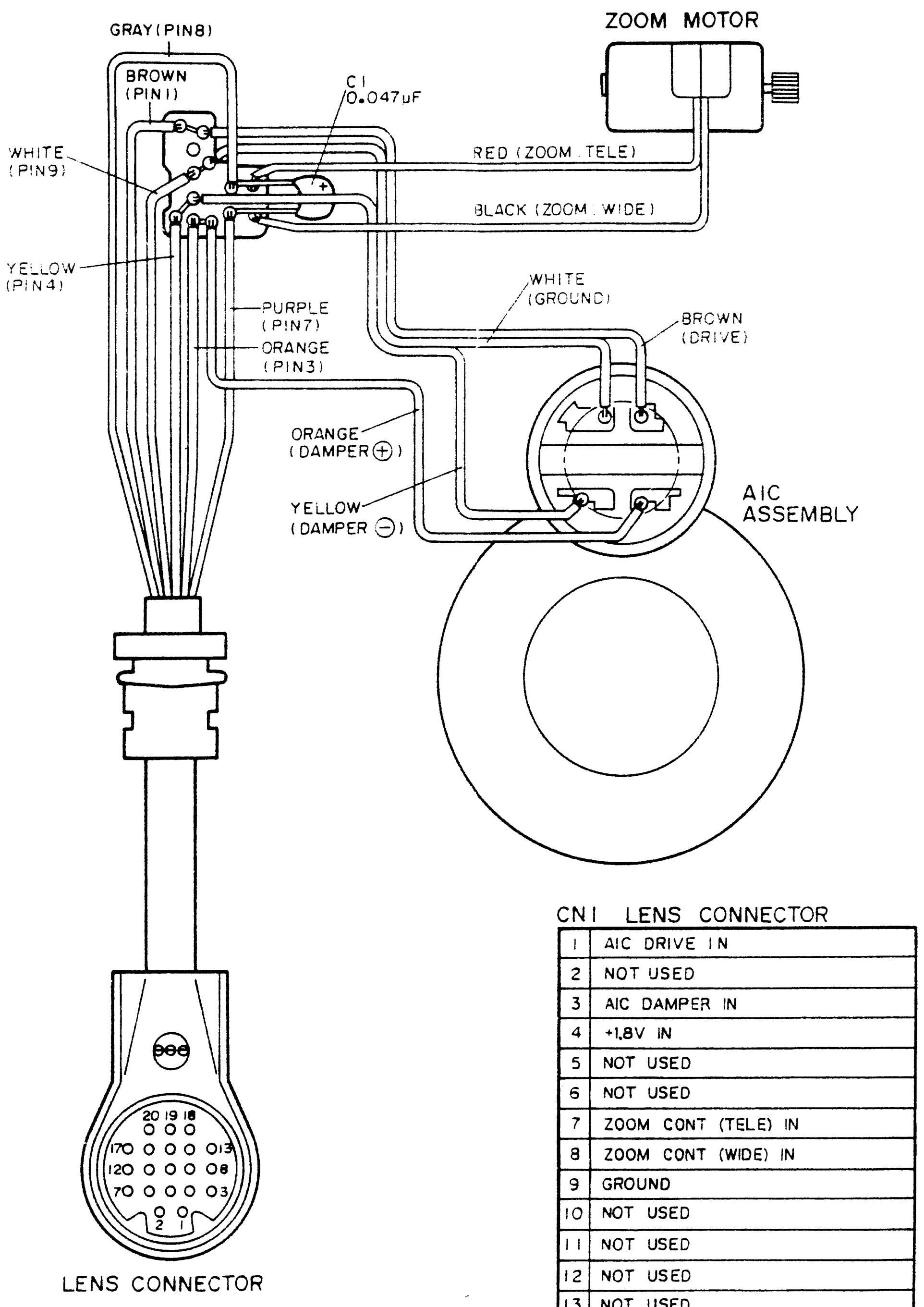
CONDUCTOR VIEW OF GRIP SHOULDER WV-GR12


SW4
SW3
SW2
SW5
SW3
TELE 1
SWITCH
SW4
TELE 2
SWITCH
ZOOM
SWITCH
BOARD
SW2
WIDE 1
SWITCH
SW5
WIDE 2
SWITCH
REC/PAUSE
SWITCH
BOARD
SW1
SW1
VTR START/
PAUSE
BUTTON
4 3 2 1
BI1
(E1)
4 3 2 1
CN2
P93
ZOOM SPEED CONT IN
ZOOM DRIVE (TELE) IN
ZOOM DRIVE (WIDE) IN
+4.9V OUT
PA3
6
5
4
3
2
1
UT
UT
UT
SWITCH BOARD
SW1
YBACK
RECORD
D1
D2
SW2
SW3
SW4
SW5
D3
D4
D5
D6
SW6
D7
SW7
D8
6
5
4
3
2
1
CN2
WV-GR12
nnector
board
connector
era head.
SW1
RECORD/PLAYBACK
SELECT SWITCH
SW2
NEG/POS
SWITCH
SW3
DATE TIME
SWITCH
SW4
TITLE
SWITCH
SW5
SET
SWITCH
SW6
REC REVIEW
SWITCH
SW7
FADE IN/OUT
SWITCH
2
3
4

WV-GR12 SWITCH BOARD

D1	MA165	A1
D2	MA165	A2
D3	MA165	A2
D4	MA165	A3
D5	MA165	A3
D6	MA165	A3
D7	MA165	A4
D8	MA165	A3

WIRING DIAGRAM OF 12X POWER ZOOM LENS WV-LZ14/12


GRAY (PIN8)
BROWN
(PIN1)
WHITE
(PIN9)
YELLOW
(PIN4)
C1
0.047μF
ZOOM MOTOR
RED (ZOOM TELE)
BLACK (ZOOM WIDE)
PURPLE
(PIN7)
ORANGE
(PIN3)
WHITE
(GROUND)
BROWN
(DRIVE)
ORANGE
(DAMPER ⊕)
YELLOW
(DAMPER ⊖)
AIC
ASSEMBLY
20 19 18
17
12
7
13
8
3
2 1
LENS CONNECTOR

CN1 LENS CONNECTOR

1	AIC DRIVE IN
2	NOT USED
3	AIC DAMPER IN
4	+1.8V IN
5	NOT USED
6	NOT USED
7	ZOOM CONT (TELE) IN
8	ZOOM CONT (WIDE) IN
9	GROUND
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	NOT USED
15	NOT USED
16	NOT USED
17	NOT USED
18	NOT USED
19	NOT USED
20	NOT USED

MAIN BOARD

IC3	MN4053BS		D6
IC4	M5234FP		D4, D6
IC5	NJM3414M		A6, A7
Q1	2SC2404-CD	[U]	A4
Q2	2SD601-QR	[Y]	A4
Q3	2SD601-QR	[Y]	A4
Q4	2SD601-QR	[Y]	A4
Q5	2SC2404-CD	[U]	A4
Q6	2SB709-Q	[A]	A5
Q7	2SC2404-CD	[U]	C3
Q8	2SC2404-CD	[U]	C4
Q9	2SC2404-CD	[U]	C4
Q18	2SB709-Q	[A]	D4
Q19	2SD601-QR	[Y]	A5
Q20	2SB709-Q	[A]	D7

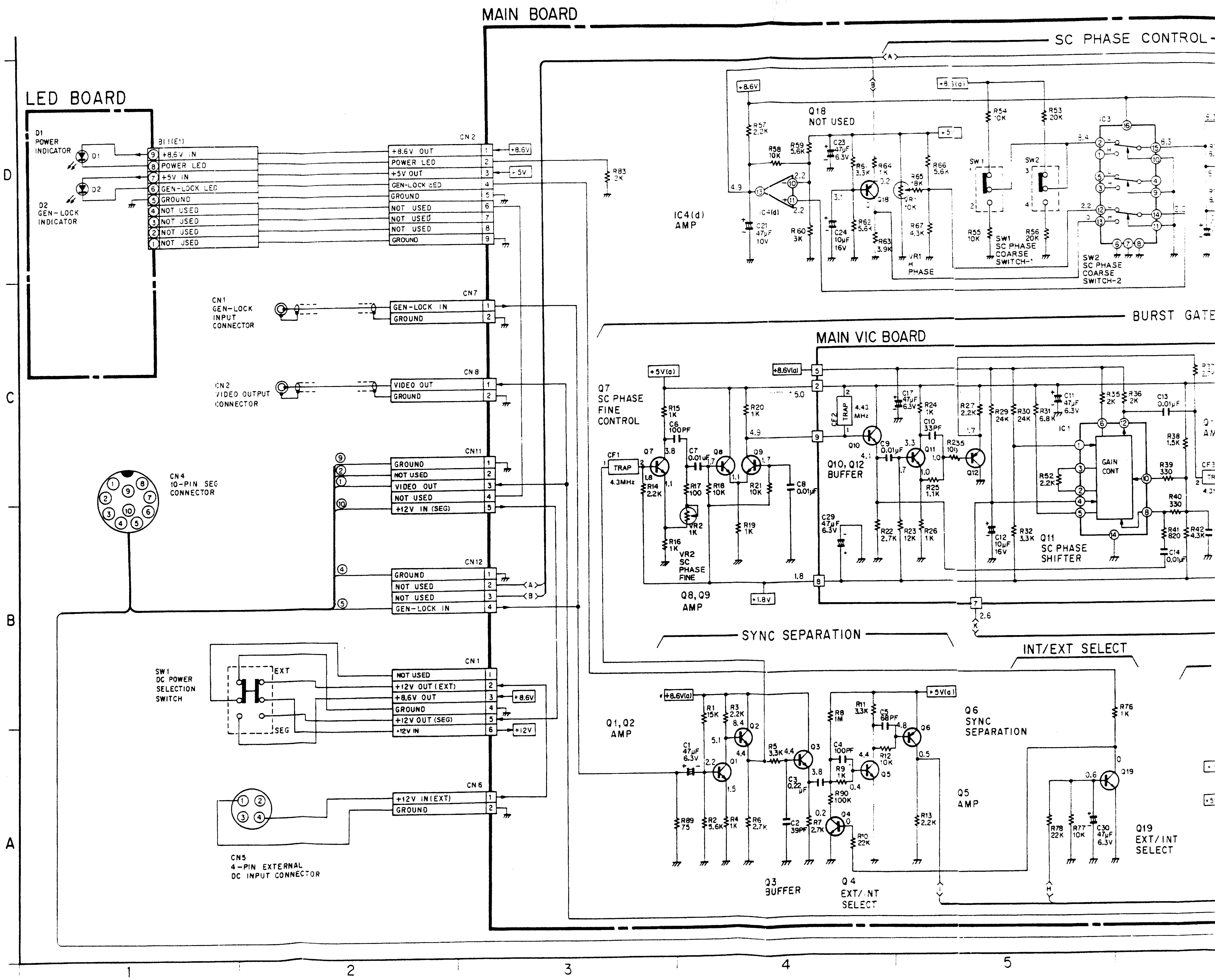
LED BOARD

D1	LN28RP	D1
D2	LN48YP	D1

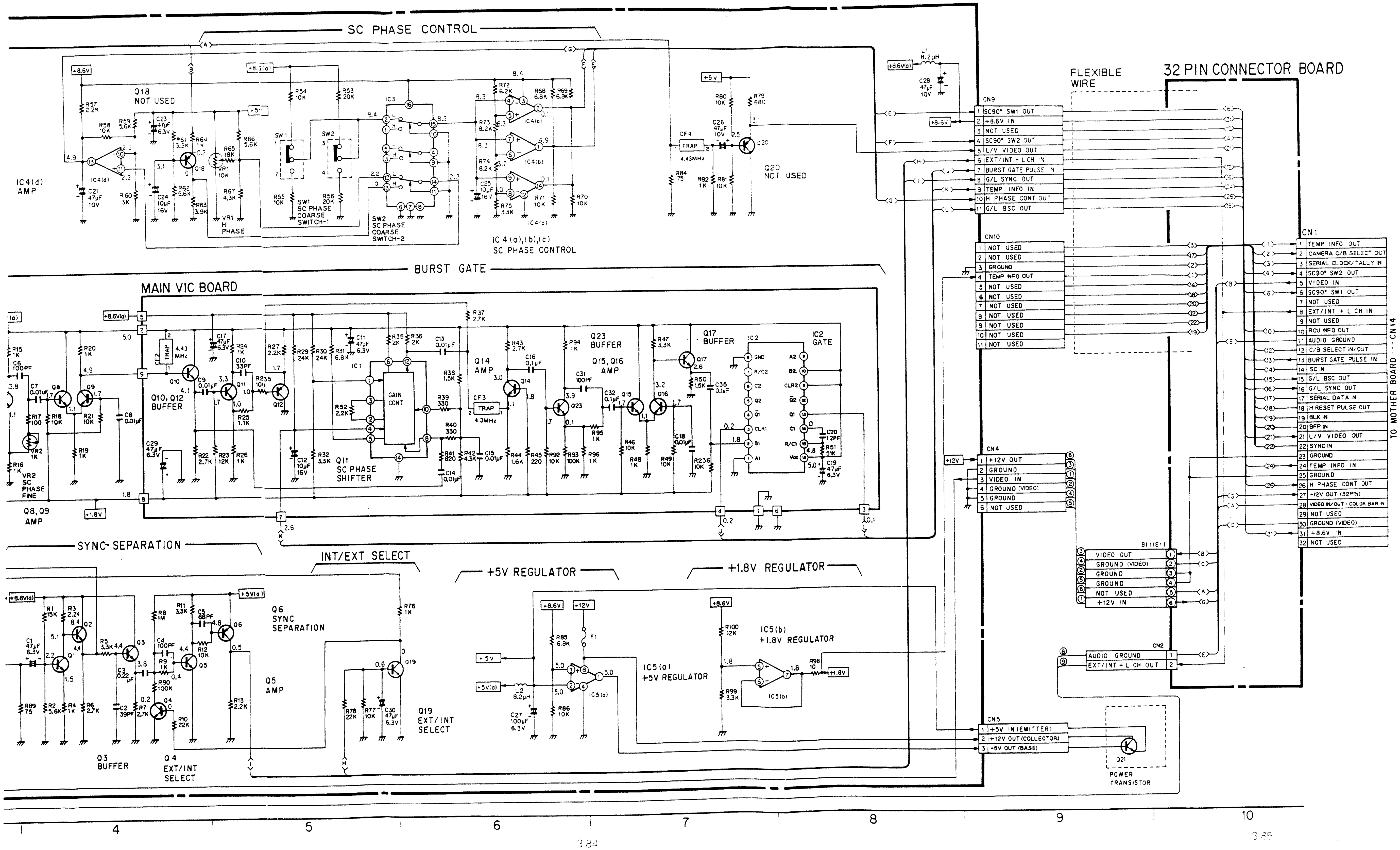
MAIN VIC BOARD

IC1	YFNJM1496M		C5, C6
IC2	MN74HC221S		C7, C8
Q10	2SC2404-CD	[U]	C4
Q11	2SC2404-CD	[U]	C5
Q12	2SA1022-CD	[E]	C5
Q14	2SC2404-CD	[U]	C6
Q15	2SC2404-CD	[U]	C7
Q16	2SC2404-CD	[U]	C7
Q17	2SC2404-CD	[U]	C7
Q23	2SC2404-CD	[U]	C6

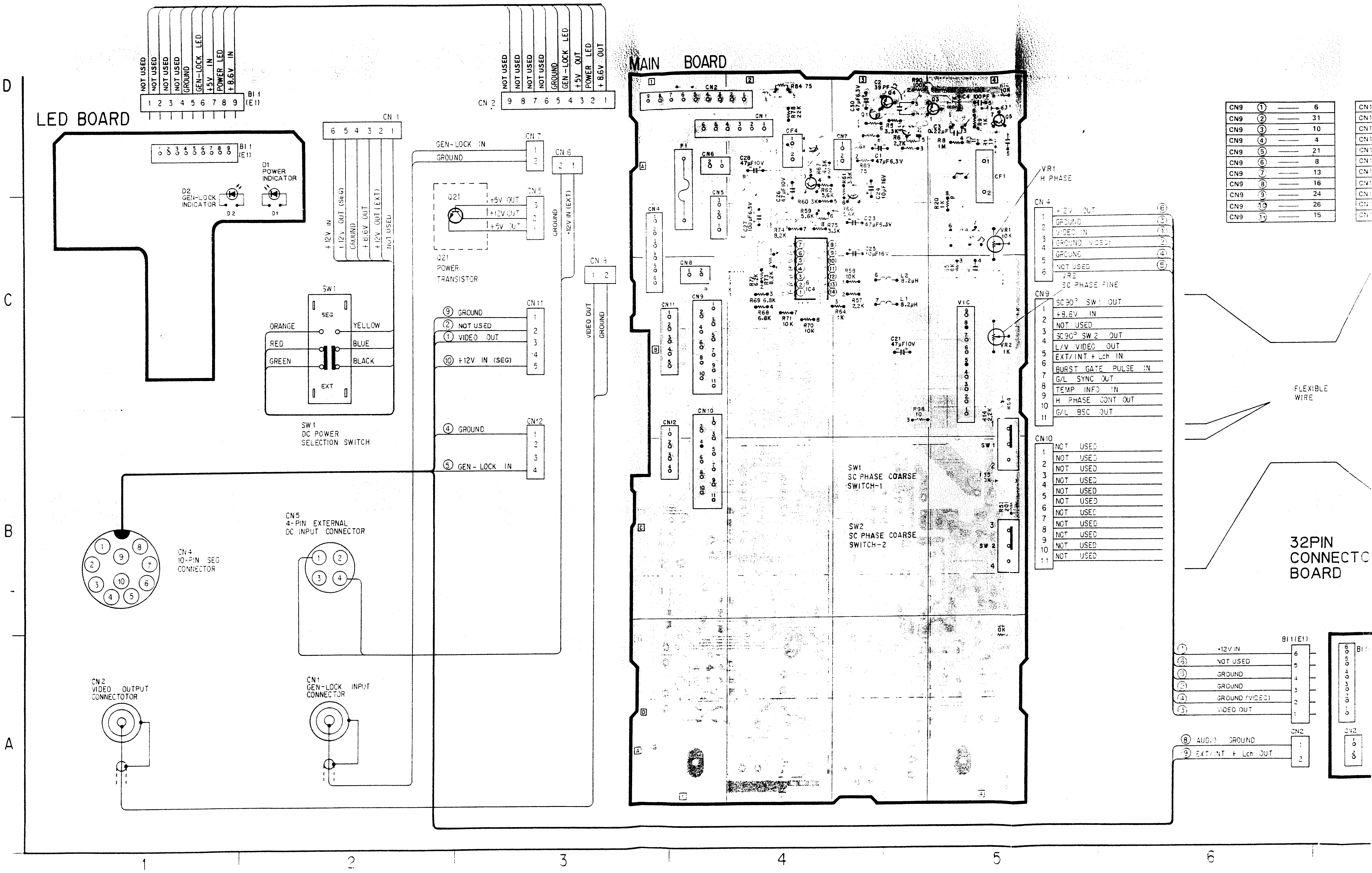
SCHEMATIC DIAGRAM OF GEN-LOC


MAIN BOARD
LED BOARD
D1 POWER INDICATOR
D2 GEN-LOCK INDICATOR
+8.6V IN
POWER LED
+5V IN
GEN-LOCK LED
GROUND
NOT USED
CN2
+8.6V OUT
POWER LED
+5V OUT
GEN-LOCK LED
GROUND
NOT USED
CN1 GEN-LOCK INPUT CONNECTOR
CN7
GEN-LOCK IN
GROUND
CN2 VIDEO OUTPUT CONNECTOR
CN8
VIDEO OUT
GROUND
CN4 10-PIN SEG CONNECTOR
CN11
GROUND
NOT USED
VIDEO OUT
NOT USED
+12V IN (SEG)
CN12
GROUND
NOT USED
NOT USED
GEN-LOCK IN
SW1 DC POWER SELECTION SWITCH
EXT
SEG
CN1
NOT USED
+12V OUT (EXT)
+8.6V OUT
GROUND
+12V OUT (SEG)
+12V IN
CN6
+12V IN (EXT)
GROUND
CN5 4-PIN EXTERNAL DC INPUT CONNECTOR
SC PHASE CONTROL
Q18 NOT USED
IC4(d) AMP
VR1 H PHASE
SW1 SC PHASE COARSE SWITCH-1
SW2 SC PHASE COARSE SWITCH-2
IC3
BURST GATE
MAIN VIC BOARD
Q7 SC PHASE FINE CONTROL
CF1 TRAP 4.3MHz
VR2 SC PHASE FINE
Q8, Q9 AMP
Q10, Q12 BUFFER
CF2 TRAP 4.43 MHz
IC1
GAIN CONT
Q11 SC PHASE SHIFTER
SYNC SEPARATION
INT/EXT SELECT
Q1, Q2 AMP
Q3 BUFFER
Q4 EXT/INT SELECT
Q5 AMP
Q6 SYNC SEPARATION
Q19 EXT/INT SELECT
+8.6V
+5V
+12V
+1.8V
D
C
B
A
1
2
3
4
5

SCHEMATIC DIAGRAM OF GEN-LOCK ADAPTOR WV-AD36

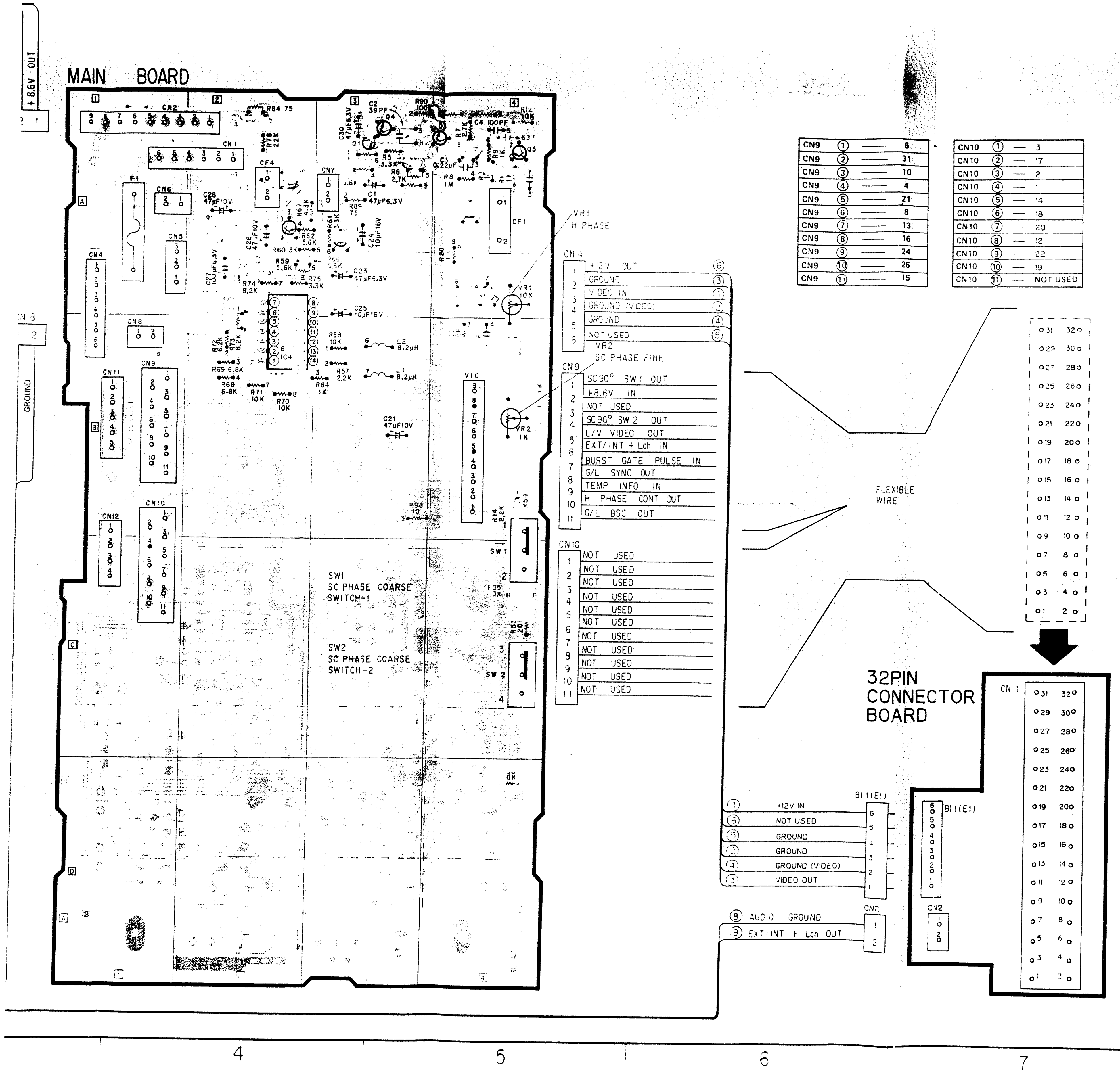

SC PHASE CONTROL
Q18 NOT USED
IC4(d) AMP
VR1 H PHASE
SW1 SC PHASE COARSE SWITCH-1
SW2 SC PHASE COARSE SWITCH-2
IC3
IC 4 (a),(b),(c) SC PHASE CONTROL
CF4 TRAP 4.43MHz
Q20 NOT USED
BURST GATE
MAIN VIC BOARD
Q8, Q9 AMP
VR2 SC PHASE FINE
Q10, Q12 BUFFER
IC1 GAIN CONT
Q11 SC PHASE SHIFTER
Q14 AMP
CF3 TRAP 4.3MHz
Q23 BUFFER
Q15, Q16 AMP
Q17 BUFFER
IC2 GATE
SYNC SEPARATION
Q3 BUFFER
Q4 EXT/INT SELECT
Q5 AMP
Q6 SYNC SEPARATION
INT/EXT SELECT
Q19 EXT/INT SELECT
+5V REGULATOR
IC5(a) +5V REGULATOR
+1.8V REGULATOR
IC5(b) +1.8V REGULATOR
FLEXIBLE WIRE
32 PIN CONNECTOR BOARD
CN9
1 SC90° SW1 OUT
2 +8.6V IN
3 NOT USED
4 SC90° SW2 OUT
5 L/V VIDEO OUT
6 EXT/INT + L CH IN
7 BURST GATE PULSE IN
8 G/L SYNC OUT
9 TEMP INFO IN
10 H PHASE CONT OUT
11 G/L BSC OUT
CN10
1 NOT USED
2 NOT USED
3 GROUND
4 TEMP INFO OUT
5 NOT USED
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
10 NOT USED
11 NOT USED
CN4
1 +12V OUT
2 GROUND
3 VIDEO IN
4 GROUND (VIDEO)
5 GROUND
6 NOT USED
B11(E1)
VIDEO OUT
GROUND (VIDEO)
GROUND
GROUND
NOT USED
+12V IN
CN2
AUDIO GROUND
EXT/INT + L CH OUT
CN5
1 +5V IN (EMITTER)
2 +12V OUT (COLLECTOR)
3 +5V OUT (BASE)
Q21 POWER TRANSISTOR
CN1
1 TEMP INFO OUT
2 CAMERA C/B SELECT OUT
3 SERIAL CLOCK/TALLY IN
4 SC90° SW2 OUT
5 VIDEO IN
6 SC90° SW1 OUT
7 NOT USED
8 EXT/INT + L CH IN
9 NOT USED
10 RCU INFO OUT
11 AUDIO GROUND
12 C/B SELECT IN/OUT
13 BURST GATE PULSE IN
14 SC IN
15 G/L BSC OUT
16 G/L SYNC OUT
17 SERIAL DATA IN
18 H RESET PULSE OUT
19 BLK IN
20 BFP IN
21 L/V VIDEO OUT
22 SYNC IN
23 GROUND
24 TEMP INFO IN
25 GROUND
26 H PHASE CONT OUT
27 +12V OUT (32PIN)
28 VIDEO IN/OUT : COLOR BAR IN
29 NOT USED
30 GROUND (VIDEO)
31 +8.6V IN
32 NOT USED
TO MOTHER BOARD --- CN14
4
5
6
7
8
9
10

CONDUCTOR VIEW OF GEN-LOCK ADAPTOR WV-AD36


LED BOARD
MAIN BOARD
32PIN CONNECTC BOARD
FLEXIBLE WIRE
D
C
B
A
1
2
3
4
5
6
BI 1 (E1)
NOT USED
NOT USED
NOT USED
NOT USED
GROUND
GEN-LOCK LED
+5V IN
POWER LED
+8.6V IN
CN 2
NOT USED
NOT USED
NOT USED
NOT USED
GROUND
GEN-LOCK LED
+5V OUT
POWER LED
+8.6V OUT
D1 POWER INDICATOR
D2 GEN-LOCK INDICATOR
CN 1
+12V IN
+12V OUT (SEG)
GROUND
+8.6V OUT
+12V OUT (EXT)
NOT USED
GEN-LOCK IN
GROUND
CN 7
CN 6
CN 5
Q21
+5V OUT
+12V OUT
+5V OUT
Q21 POWER TRANSISTOR
GROUND
+12V IN (EXT)
CN 8
VIDEO OUT
GROUND
SW1
SEG
EXT
ORANGE
RED
GREEN
YELLOW
BLUE
BLACK
SW1 DC POWER SELECTION SWITCH
CN11
⑨ GROUND
② NOT USED
① VIDEO OUT
⑩ +12V IN (SEG)
CN12
④ GROUND
⑤ GEN-LOCK IN
CN4 10-PIN SEG CONNECTOR
CN5 4-PIN EXTERNAL DC INPUT CONNECTOR
CN2 VIDEO OUTPUT CONNECTOTOR
CN1 GEN-LOCK INPUT CONNECTOR
VR1 H PHASE
VR2 SC PHASE FINE
SW1 SC PHASE COARSE SWITCH-1
SW2 SC PHASE COARSE SWITCH-2
CN 4
+12V OUT
GROUND
VIDEO IN
GROUND (VIDEO)
GROUND
NOT USED
CN9
SC90° SW 1 OUT
+8.6V IN
NOT USED
SC90° SW 2 OUT
L/V VIDEO OUT
EXT/INT + Lch IN
BURST GATE PULSE IN
G/L SYNC OUT
TEMP INFO IN
H PHASE CONT OUT
G/L BSC OUT
CN10
NOT USED
BI 1 (E1)
+12V IN
NOT USED
GROUND
GROUND
GROUND (VIDEO)
VIDEO OUT
CN2
⑧ AUDIO GROUND
⑨ EXT/INT + Lch OUT
IC4
L1 8.2μH
L2 8.2μH
F1
CF1
CF4

CN9	①	——	6
CN9	②	——	31
CN9	③	——	10
CN9	④	——	4
CN9	⑤	——	21
CN9	⑥	——	8
CN9	⑦	——	13
CN9	⑧	——	16
CN9	⑨	——	24
CN9	⑩	——	26
CN9	⑪	——	15

CONDUCTOR VIEW OF GEN-LOCK ADAPTOR WV-AD36


+8.6V OUT
GROUND
MAIN BOARD
CN2
CN1
CF4
CN7
CN6
CN5
CN4
CN8
CN9
CN11
CN12
CN10
F1
IC4
CF1
VIC
VR1 H PHASE
VR2 SC PHASE FINE
SW1 SC PHASE COARSE SWITCH-1
SW2 SC PHASE COARSE SWITCH-2
CN 4
1 +12V OUT ⑥
2 GROUND ③
3 VIDEO IN ①
4 GROUND (VIDEO) ②
5 GROUND ④
6 NOT USED ⑤
CN9
1 SC90° SW1 OUT
2 +8.6V IN
3 NOT USED
4 SC90° SW 2 OUT
5 L/V VIDEO OUT
6 EXT/INT + Lch IN
7 BURST GATE PULSE IN
8 G/L SYNC OUT
9 TEMP INFO IN
10 H PHASE CONT OUT
11 G/L BSC OUT
CN10
1 NOT USED
2 NOT USED
3 NOT USED
4 NOT USED
5 NOT USED
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
10 NOT USED
11 NOT USED
FLEXIBLE WIRE
32PIN CONNECTOR BOARD
CN1
BI1(E1)
① +12V IN 6
⑥ NOT USED 5
⑤ GROUND 4
② GROUND 3
④ GROUND (VIDEO) 2
③ VIDEO OUT 1
CN2
⑧ AUDIO GROUND 1
⑨ EXT INT + Lch OUT 2
4
5
6
7
8

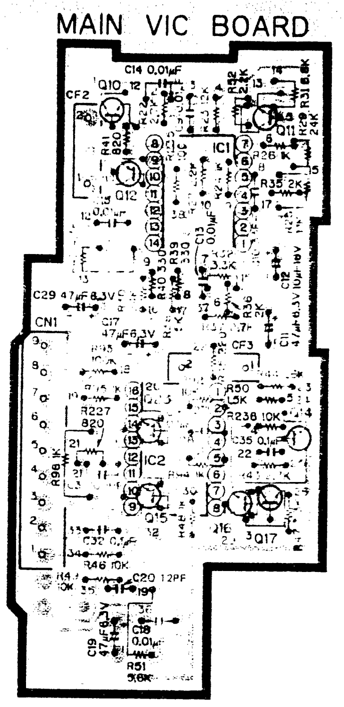
CN9	①	—	6
CN9	②	—	31
CN9	③	—	10
CN9	④	—	4
CN9	⑤	—	21
CN9	⑥	—	8
CN9	⑦	—	13
CN9	⑧	—	16
CN9	⑨	—	24
CN9	⑩	—	26
CN9	⑪	—	15

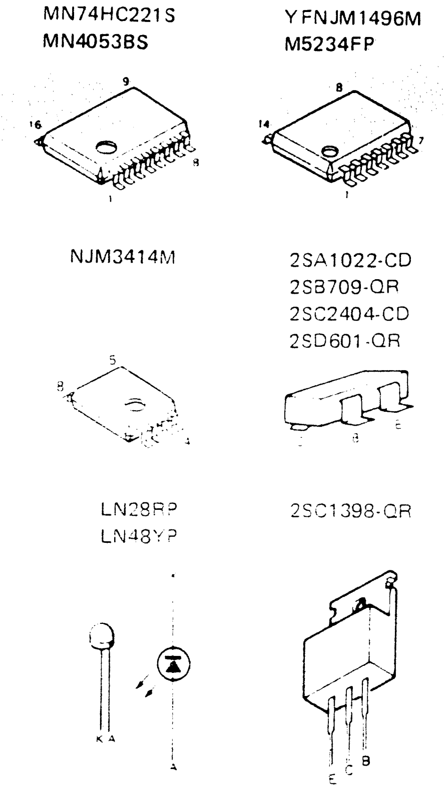
CN10	①	—	3
CN10	②	—	17
CN10	③	—	2
CN10	④	—	1
CN10	⑤	—	14
CN10	⑥	—	18
CN10	⑦	—	20
CN10	⑧	—	12
CN10	⑨	—	22
CN10	⑩	—	19
CN10	⑪	—	NOT USED

CN1 (TO MOTHER BOARD---CN14)

1	TEMP INFO OUT	2	CAMERA C/B SELECT OUT
3	SERIAL CLOCK/TALLY IN	4	SC90° SW2 OUT
5	VIDEO IN	6	SC90° SW1 OUT
7	NOT USED	8	EXT/INT + L CH IN
9	NOT USED	10	RCU INFO OUT
11	AUDIO GROUD	12	C/B SELECT IN/OUT
13	BURST GATE PULSE IN	14	SC IN
15	G/L BSC OUT	16	G/L SYNC OUT
17	SERIAL DATA IN	18	H RESET PULSE OUT
19	BLK IN	20	BFP IN
21	L/V VIDEO OUT	22	SYNC IN
23	GROUND	24	TEMP INFO IN
25	GROUND	26	H PHASE CONT OUT
27	+12V OUT (32PIN)	28	VIDEO IN/OUT [illegible]
29	NOT USED	30	GROUND (VIDEO)
31	+8.6V IN	32	NOT USED

—·— COMPONENT SIDE
—·— PATTERN SIDE


MAIN VIC BOARD
CF2
CN1
IC1
IC2
CF3


MN74HC221S
MN4053BS
YFNJM1496M
M5234FP
NJM3414M
2SA1022-CD
2SB709-QR
2SC2404-CD
2SD601-QR
LN28RP
LN48YP
2SC1398-QR
K A
E C B

MAIN BOARD

IC3	MN4053BS		C4
IC4	M5234FP		C4
IC5	NJM3414M		C4
Q1	2SC2404-CD	[U]	D4
Q2	2SD601-QR	[Y]	D5
Q3	2SD601-QR	[Y]	D5
Q4	2SD601-QR	[Y]	D5
Q5	2SC2404-CD	[U]	D5
Q6	2SB709-Q	[A]	D5
Q7	2SC2404-CD	[U]	C5
Q8	2SC2404-CD	[U]	C5
Q9	2SC2404-CD	[U]	D5
Q18	2SB709-Q	[A]	D4
Q19	2SD601-QR	[Y]	D4
Q20	2SB709-Q	[A]	D4
Q21	2SC1398-QR		C3

LED BOARD

D1	LN28RP	C2
D2	LN48YP	C1

MAIN VIC BOARD

IC1	YFNJM1496M		D8
IC2	MN74HC221S		C8
Q10	2SC2404-CD	[U]	D8
Q11	2SC2404-CD	[U]	D8
Q12	2SA1022-CD	[E]	D8
Q14	2SC2404-CD	[U]	C8
Q15	2SC2404-CD	[U]	C8
Q16	2SC2404-CD	[U]	C8
Q17	2SC2404-CD	[U]	C8
Q23	2SC2404-CD	[illegible]	C8

Service Manual

Vol. 4

Replacement Parts List
Exploded View

System Camera
WVP-F10

1" Electronic Viewfinder
WV-VF01

Gen-lock Adaptor
WV-AD36

Stereo Microphone
WV-MC12

8X Auto Focus Lens
WV-LZ14/8AF

Grip Shoulder
WV-GR12

12X Power Zoom Lens
WV-LZ14/12

Cheek Pad
WV-Q43

CONTENTS

PARTS LIST

System Camera (WVP-F10)
- Miscellaneous 4-1
- Process Board (YFVKB3260E1A) 4-2
- Process VIC-1 Board (YFVKC3260E2A) 4-3
- Process VIC-2 Board (YFVKD3260E2A) 4-4
- Process VIC-3 (a) Board (YFVKE3260E2A) 4-4
- Process VIC-3 (b) Board (YFVKE3260E2A) 4-4
- Process VIC-4 Board (YFVKF3260E2A) 4-5
- Microprocessor Board (YFVKC3260E1A) 4-5
- Microprocessor VIC-1 Board (YFVKG3260P2A) 4-7
- Microprocessor VIC-2 Board (YFVKG3260P2A) 4-7
- Power/Sync Board (YFVKZ3260E7A) 4-7
- Power/Sync VIC-1 Board (YFVKH3260E2A) 4-9
- Power/Sync VIC-2 Board (YFVKI3260E2A) 4-9
- Power/Sync VIC-3 Board (YFVKK3260E2A) 4-10
- CCD Board (YFVKB3260E2A) 4-10
- CCD Drive Board (YFVKY3260E1A) 4-10
- Mother Board (YFVKZ3260P1A) 4-11
- Control Board (YFVKC3260P3A) 4-12
- ATW Connector Board (YFVKZ3260P5A) 4-12
- ATW VIC-1 Board (YFVKJ3260P2A) 4-12
- Audio Board (YFVKB3260P3A) 4-12
- Accessory Parts/Packaging Parts 4-13

1" Electronic Viewfinder (WV-VF01) 4-13
- Miscellaneous 4-13
- EVF Board (YFVKBVF01E1A) 4-14
- EVF VIC Board (YFVKCVF01P1A) 4-15
- EVF ATW Connector Board (YFVKZVF01P1A) 4-15
- EVF ATW Board (YFVKZ3260P6A) 4-15
- Accessory Parts/Packaging Parts 4-15

Grip Shoulder (WV-GR12) 4-15
- Miscellaneous 4-15
- Switch Board (YFVKYGR12P1A) 4-16
- VTR Short/Pause Switch Board (YWV3100ZR07) 4-16
- Zoom Switch Board (YFVKZGR12P1A) 4-16
- Accessory Parts/Packaging Parts 4-16

Cheek Pad (WV-Q43) 4-16
- Miscellaneous 4-16
- Accessory Parts/Packaging Parts 4-16

8X Autofocus Lens (WV-LZ14/8AF) 4-16
- Miscellaneous 4-16
- Autofocus Board (YFVKY3260E2A) 4-17
- Accessory Parts/Packaging Parts 4-18

12X Power Zoom Lens (WV-LZ14/12) 4-19
- Miscellaneous 4-19
- Accessory Parts/Packaging Parts 4-19

Stereo Microphone (WV-MC12) 4-19
- Miscellaneous 4-19
- Accessory Parts/Packaging Parts 4-19

Camera Cable (WV-CA10) 4-19

Gen-Lock Adaptor (WV-AD36) 4-19
- Miscellaneous 4-19
- Main Board (YFVKBAD36E1A) 4-19
- Main VIC Board (YFVKCAD36E1A) 4-20
- LED Board (YFVKZAD36P1A) 4-21
- 32 pin Connector Board (YFVKZAD36P2A) 4-21
- Accessory Parts/Packaging Parts 4-21

EXPLODED VIEW

System Camera (WVP-F10) .... 4-22 ~ 4-24
- 1" Electronic Viewfinder (WV-VF01) .... 4-25 ~ 4-27
- Grip Shoulder (WV-GR12) .... 4-25 ~ 4-27
- Cheek Pad (WV-Q43) .... 4-28 ~ 4-29
- Stereo Microphone (WV-MC12) 4-28, 4-29
- Camera Cable (WV-CA10) 4-28, 4-29
- 12X Power Zoom Lens (WV-LZ14/12) 4-30, 4-31
- 8X Autofocus Lens (WV-LZ14/8AF) 4-30, 4-31
- Gen-Lock Adaptor (WV-AD36) 4-32, 4-33
- Packaging (WVP-F10) 4-34

REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by "o" mark are new parts used from this model.
3. Complete printed circuit board assembly is not available as replacement part.

COLOUR VIDEO CAMERA WVP-F10

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
CN1	o YFD0121N600	EVF / Camera Remote Connector
CN2	o YFD0111N609	Character Generator Connector
CN3	o YFD5110N601	Pan / Tilt Connector
CN4	o YFDJ210N200	20 Pin Lens Connector
CN5	o EMCTMA06C03V	10 Pin VTR Connector Assy
CN6	o YFXC5B1431	14 Pin Connector
E4	o YFF10F3A	Flexible Jumper
E5	o YFF10F4A	Flexible Jumper
M1	o YFV5EA0363B1	Front Cover
M3	o YFV2TB0025A3	Mounting Bracket
M4	o YFV4JA0038A3	Mounting Spring
M5	o YFV5RA0067A3	Lens Lock Knob
M6	o YFV1HA0009A4	Lens Lock Pin
M7	o YFV4RA0018A4	Mounting Angle for Lock Lever
M9	o YFV3FA0030A4	BF Control Ring 2
M10	o YFV2SA0244A4	Mounting Angle for ATW Board
M11	o YFMN3741FKIT	CCD Kit
M12	o YFV5GA0044A4	Body Cap
M16	o YFV2PA0163A4	Insulator Spacer B
M17	o YFV2HA0368A3	Shield Case for CCD Board
M18	o YFV2PA0164A4	Insulator Parts for Switch
M19	o YFV4JA0037A4	Lens Lock Spring
M20	o YFV1KA0033A4	Washer
M23	o YFTM-96-N06	Clamp Rubber Cap
M24	o YFV5KA0074A2	Case
M25	o YFV3CA0067A3	Parts Holder
M26	o YFV3CA0068A3	Parts Hold
M29 ⚠	YFV7MA0099A4	Caution Label
M31	o YFV5EC0364B1	Right Side Cover
M32	o YFV5EA0382A3	Control Panel Cover
M33	o YFV5VA0041A4	Pad for Control Panel Cover
M34	o YFV4JA0120B4	Spring for Pad
M35	o YFV6JA0037A4	ATW Push Button
M36	o YFV4JA0119B4	Power Spring
M37	o YFV1HA0023A4	Pin
M38	o YFV5RA0068B4	Knob
M39	o YFV7PA0039A4	National Badge for WVP-F10E, WVP-F10EB,WVP-F10EG
	o YFV7PA0041A4	National Badge for WVP-F10N WVP-F10NA
M40	o YFV5WB0300A4	Control Panel
M41	o YFV5EC0365A1	Left Side Cover
M42	o YFV5EA0366A1	Connector Cover
M43	o YFV5EA0367B2	Connector Cover
M44	o YFV5EA0368A3	Battery Cover
M45	o YFV2SA0249A4	Connector Mounting Plate
M46	o YFV4JA0122A4	Coil Spring for Battery
M47	o YFV4JA0123A4	Spring Plate for Battery
M48	o YFV5WA0299A4	Blank Panel for Switch
M49	o YFV2SA0243A4	Mounting Angle for Microphone
M50	o YFV2HA0424A4	Shield Parts
M51	o YFV2PA0166A4	Insulator Paper for Audio Board
M52	o YFV3CA0066A4	Mic Holder
M53	o YFXPL2A10WV	Spring Pin
M54	o YFV5GA0046A4	Blank Cap
M55	o YFV5EA0369A3	RF Control Cover
M56 ⚠	YFV7MA0180A4	Caution Label
M57	o YFV2FA0128A4	Cushion for Push Switch
M58	o YFV7MA0234A4	ATW Connector Blank Label
M59	o YFV2HA0428A4	Shield Plate for Beat
M68	o YFV5RA0057B4	Sliede Knob A
M69	o YFV2HA0367A4	Mounting Plate
M70	o YFV2HA0398A4	Shielde Cover for CCD Drive Board
M86	o YFV5RA0069A4	VR Knob
M87	o YFV5RA0070A4	Sliede Knob B
M90	o YFV7PA0040A4	Digital Badge for WVP-F10E, WVP-F10EB,WVP-F10EG
	o YFV7PA0042A4	Digital Badge for WVP-F10N WVP-F10NA
M91 ⚠	o YFV7QA1119A4	Main Label for WVP-F10EB
⚠	o YFV7QA1118A4	Main Label for WVP-F10E WVP-F10EG
⚠	o YFV7QA1120A4	Main Label for WVP-F10NA WVP-F10N
M92	YFV7MA0103A4	Shock Label
M93	YFV7MA0106A4	CSA Caution

PROCESS BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB1	o YFVKB3260E1A	Printed Circuit Board Assy	
IC1	HB31	IC	
IC2	HB12	IC	
IC3	HB18	IC	
IC4	NJM4053BM	IC	
IC5	AN2361S	IC	
IC6	MN3106S	IC	
IC7	AN2210SA	IC	
IC8	HB16	IC	
IC101	AN2110S	IC	
IC102	AN2020S	IC	
IC103	MN8037S	IC	
Q1	2SB709-Q	Transistor	
Q2,3	2SD601-QR	Transistor	
Q4,5	2SC2404-CDTW	Transistor	
Q6	2SD601-QR	Transistor	
Q7	2SB709-Q	Transistor	
Q8	2SK198-Q	FET	
Q9	2SC2404-CDTW	Transistor	
Q10	2SD601-QR	Transistor	
Q11	2SB709-Q	Transistor	
Q12,13	2SD601-QR	Transistor	
Q14	2SB709-Q	Transistor	
Q15	2SC2404-CDTW	Transistor	
Q16,17	2SD601-QR	Transistor	
Q20	2SC2404-CDTW	Transistor	
D1,2	MA151K	Diode	
R1	YF2116104JT	Carbon	100K ohms 1/16W
R2	YF2116153JT	Carbon	15K ohms 1/16W
R3	YF2116473GT	Carbon	47K ohms 1/16W
R4	YF2116153JT	Carbon	15K ohms 1/16W
R5	YF2116472JT	Carbon	4.7K ohms 1/16W
R6	YF2116104JT	Carbon	100K ohms 1/16W
R9	YF2116221JT	Carbon	220 ohms 1/16W
R10	YF2116472JT	Carbon	4.7K ohms 1/16W
R11	YF2116302JT	Carbon	3K ohms 1/16W
R12	YF2116102GT	Carbon	1K ohms 1/16W
R13-15	YF2116103JT	Carbon	10K ohms 1/16W
R16	YF2116133JT	Carbon	13K ohms 1/16W
R17,18	YF2116102GT	Carbon	1K ohms 1/16W
R19	YF2116562JT	Carbon	5.6K ohms 1/16W
R20	YF2116752JT	Carbon	7.5K ohms 1/16W
R21	YF2116103JT	Carbon	10K ohms 1/16W
R22-24	YF2116203JT	Carbon	20K ohms 1/16W
R25	YF2116123JT	Carbon	12K ohms 1/16W
R26	YF2116152JT	Carbon	1.5K ohms 1/16W
R27	YF2116472JT	Carbon	4.7K ohms 1/16W
R28	YF2116102GT	Carbon	1K ohms 1/16W
R29	YF2116471JT	Carbon	470 ohms 1/16W
R30	YF2116563JT	Carbon	56K ohms 1/16W
R31	YF2116273JT	Carbon	27K ohms 1/16W
R32	YF2116681JT	Carbon	680 ohms 1/16W
R33	YF2116822JT	Carbon	8.2K ohms 1/16W
R34	YF2116103JT	Carbon	10K ohms 1/16W
R35	YF2116202JT	Carbon	2K ohms 1/16W
R36	YF2116102GT	Carbon	1K ohms 1/16W
R37	YF2116151JT	Carbon	150 ohms 1/16W
R38	YF2116392JT	Carbon	3.9K ohms 1/16W
R39	YF2116153JT	Carbon	15K ohms 1/16W
R40	YF2116684JT	Carbon	680K ohms 1/16W
R41,42	YF2116103JT	Carbon	10K ohms 1/16W
R43	YF2116102GT	Carbon	1K ohms 1/16W
R44	YF2116103JT	Carbon	10K ohms 1/16W
R45	YF2116561JT	Carbon	560 ohms 1/16W
R46	YF2116103JT	Carbon	10K ohms 1/16W
R47	YFLP163K3GT7	Metal	3.3K ohms
R48	YF2116102GT	Carbon	1K ohms 1/16W
R49	YF2116821GT	Carbon	820 ohms 1/16W
R50	YF2116473GT	Carbon	47K ohms 1/16W
R51,52	YF2116152JT	Carbon	1.5K ohms 1/16W
R53	YF2116102GT	Carbon	1K ohms 1/16W
R54	YF2116103JT	Carbon	10K ohms 1/16W
R55	YF2116123JT	Carbon	12K ohms 1/16W
R56	YF2116392JT	Carbon	3.9K ohms 1/16W
R57	YF2116102GT	Carbon	1K ohms 1/16W
R58	YF2116392JT	Carbon	3.9K ohms 1/16W
R59	YF2116153JT	Carbon	15K ohms 1/16W
R60	YF2116102GT	Carbon	1K ohms 1/16W
R61	YF2116680JT	Carbon	68 ohms 1/16W
R62	YF2116563JT	Carbon	56K ohms 1/16W
R63	YF2116221JT	Carbon	220 ohms 1/16W
R64	YF2116202JT	Carbon	2K ohms 1/16W
R65	YF2116182JT	Carbon	1.8K ohms 1/16W
R66	YF2116473GT	Carbon	47K ohms 1/16W
R67	YF2116102GT	Carbon	1K ohms 1/16W
R68	YF2116334JT	Carbon	330K ohms 1/16W
R70	YF2116102GT	Carbon	1K ohms 1/16W
R71	YF2116821GT	Carbon	820 ohms 1/16W
R84	YF2116223JT	Carbon	22K ohms 1/16W
R85	YF2116102GT	Carbon	1K ohms 1/16W
R86	YF2116391JT	Carbon	390 ohms 1/16W
R101	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R301	YF2116273JT	Carbon	27K ohms 1/16W
R302	YF2116103JT	Carbon	10K ohms 1/16W
VR1	YFH0521A22K	Variable Resistor	22K ohms
VR2	YFH0521A10K	Variable Resistor	10K ohms
VR3	YWH0521A680	Variable Resistor	68K ohms
VR4	RJ-4W102	Variable Resistor	1K ohms
VR5	EVM13SW00B E4	Variable Resistor	22K ohms
VR6	YFH0521A470	Variable Resistor	47 ohms
VR7	YFH0521A1R5K	Variable Resistor	1.5K ohms
C1,2	ECEA0GKS470	Electrolytic	47 µF 4V
C3	ECEA1CKS220	Electrolytic	22 µF 16V
C4	ECEA0JKS470	Electrolytic	47 µF 6.3V
C5,6	ECEA1HKS010	Electrolytic	1 µF 50V
C7	ECSF1CE476	Tantalum	47µF 16V
C8	ECEA0GKS221	Electrolytic	220 µF 4V

SYMBOL NO.	PART NO.	DESCRIPTION	
C9	ECSF1AE336	Tantalum	33 µF 10V
C10	ECSF0JE336	Tantalum	33µF 6.3V
C11	ECEA0GKS470	Electrolytic	47 µF 4V
C12	ECEA0JKS220	Electrolytic	22 µF 6.3V
C13	YF400104FZT	Ceramic	0.1 µF
C14	ECEA1AKS330	Electrolytic	33 µF 10V
C15,16	ECEA0GKS470	Electrolytic	47 µF 4V
C17	YF400104FZT	Ceramic	0.1 µF
C18	ECEA0GKS470	Electrolytic	47 µF 4V
C19	YF400104FZT	Ceramic	0.1 µF
C20	ECEA1CKS220	Electrolytic	22 µF 16V
C21	ECEA0GKS470	Electrolytic	47 µF 4V
C22	YF400104FZT	Ceramic	0.1 µF
C23	YF400101CHJT	Ceramic	100 pF
C24,25	ECEA0GKS470	Electrolytic	47 µF 4V
C26	ECEA0JKS470	Electrolytic	47 µF 6.3V
C27	ECEA0GKS470	Electrolytic	47 µF 4V
C28,29	YF400104FZT	Ceramic	0.1 µF
C30	ECEA0GKS470	Electrolytic	47 µF 4V
C31	YF400104FZT	Ceramic	0.1 µF
C32	ECSF1AE336	Electrolytic	33 µF 10V
C33	YF400222XKT	Ceramic	2200 pF
C34	ECSF1AE336	Electrolytic	33 µF 10V
C35	YF400472XKT	Ceramic	4700pF
C36	YF426473XKS	Ceramic	0.047 µF 50V
C37	YF400820CHJT	Ceramic	82 pF
C38	ECEA0JU102	Electrolytic	1000 µF 6.3V
C39	ECEA1VKS4R7	Electrolytic	4.7µF 35V
C40	YF400101CHJT	Ceramic	100 pF
C41	ECEA0GKS470	Electrolytic	47 µF 4V
C42,43	YF400104FZT	Ceramic	0.1 µF
C44	ECSF1AE336	Electrolytic	33 µF 10V
C45	ECSF0JE226	Electrolytic	22 µF 6.3V
C46	ECEA0JKS470	Electrolytic	47 µF 6.3V
C48,49	YF400680CHJT	Ceramic	68 pF CH
C50	YF400271CHJT	Ceramic	270 pF
C61,62	ECSE1CT335SM	Electrolytic	3.3 µF 16V
L1,2	EL05SI470K	Coil	47 µH
L4	NL32T8R2K	Coil	8.2 µH
L5	YFF3216E8R2K	Coil	8.2 µH
L6,7	NL32T8R2K	Coil	8.2 µH
L8	YFF3216E8R2K	Coil	8.2 µH
L9	YFF3225C470K	Coil	47 µH
L10	NL32T1R0K	Coil	1 µH
CF1	YFELB4K040	Filter	
CF2	YFELB5A044	Filter	
CF3	YFSLC851555	Filter	
CF4	YFSLP4031	Filter	
CF5	YFELB4K039	Filter	
CF6	YFELB4K028	Filter	
CF7	YFSDL4061	Filter	
CN1,2-JF	YF563330APB	30 pin Jack Female	
M61	YFV2HA0374B4	Shield Cover-1	
M62	YFV2HA0375B4	Shield Cover-2	

PROCESS VIC-1 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB2	o YFVKC3260E2A	Printed Circuit Board Assy	
IC1	AN2410S	IC	
IC2	NJM319M	IC	
Q1-4	2SD601-QR	Transistor	
Q5,6	2SK198-Q	FET	
Q7	2SD601-QR	Transistor	
Q8	2SC2404-CDTW	Transistor	
Q9,10	2SB709-Q	Transistor	
Q11	2SA1022-CD	Transistor	
Q12	2SC2404-CDTW	Transistor	
Q13,14	2SD601-QR	Transistor	
Q15	2SB709-Q	Transistor	
D1	MA151K	Diode	
R3,4	YF2116102GT	Carbon	1K ohms 1/16W
R5	YF2116153JT	Carbon	15K ohms 1/16W
R6	YF2116122JT	Carbon	1.2K ohms 1/16W
R7	YF2116752JT	Carbon	7.5K ohms 1/16W
R8	YF2116102GT	Carbon	1K ohms 1/16W
R9	YF2116122JT	Carbon	1.2K ohms 1/16W
R10	YF2116133JT	Carbon	13K ohms 1/16W
R11	YF2116202JT	Carbon	2K ohms 1/16W
R12	YF2116153JT	Carbon	15K ohms 1/16W
R13	YF2116102GT	Carbon	1K ohms 1/16W
R14	YF2116122JT	Carbon	1.2K ohms 1/16W
R15	YF2116133JT	Carbon	13K ohms 1/16W
R16	YF2116202JT	Carbon	2K ohms 1/16W
R17	YF2116153JT	Carbon	15K ohms 1/16W
R18	YF2116102GT	Carbon	1K ohms 1/16W
R19	YF2116103JT	Carbon	10K ohms 1/16W
R20-22	YF2116334JT	Carbon	330K ohms 1/16W
R23,24	YF2116103JT	Carbon	10K ohms 1/16W
R25	YF2116221JT	Carbon	220 ohms 1/16W
R26	YF2116100JT	Carbon	10 ohms 1/16W
R27	YF2116122JT	Carbon	1.2K ohms 1/16W
R28	YF2116473GT	Carbon	47K ohms 1/16W
R29,30	YF2116102GT	Carbon	1K ohms 1/16W
R31	YF2116123JT	Carbon	12K ohms 1/16W
R32	YF2116203JT	Carbon	20K ohms 1/16W
R33	YF2116561JT	Carbon	560 ohms 1/16W
R34	YF2116182JT	Carbon	1.8K ohms 1/16W
R35	YF2116561JT	Carbon	560 ohms 1/16W
R36	YF2116332JT	Carbon	3.3K ohms 1/16W
R37	YF2116102GT	Carbon	1K ohms 1/16W
R38	YF2116105JT	Carbon	1M ohms 1/16W
R39,40	YF2116512JT	Carbon	5.1K ohms 1/16W
R41	YF2116104JT	Carbon	100K ohms 1/16W
R42	YF2116103JT	Carbon	10K ohms 1/16W
R43	YF2116302JT	Carbon	3K ohms 1/16W
R44,45	YF2116181JT	Carbon	180 ohms 1/16W
R46	YF2116302JT	Carbon	3K ohms 1/16W
R47	YF2116511JT	Carbon	510 ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION
R6	YF2116151JT	Carbon 150 ohms 1/16W
R7	YF2116103JT	Carbon 10K ohms 1/16W
R8	YF2116511JT	Carbon 510 ohms 1/16W
R9	YF2116241JT	Carbon 240 ohms 1/16W
R10	YF2116102GT	Carbon 1K ohms 1/16W
R11	YF2116151JT	Carbon 150 ohms 1/16W
R12	YF2116102GT	Carbon 1K ohms 1/16W
R13	YF2116392JT	Carbon 3.9K ohms 1/16W
R14	YF2116511JT	Carbon 510 ohms 1/16W
VR1	YFH0522A10K	Variable Resistor 10K ohms
VR2	YFH0522A1R5K	Variable Resistor 1.5K ohms
C1	ECEA1AKS330	Electrolytic 33 µF 10V
C2	YF400104FZT	Ceramic 0.1 µF
C3	YF400103XKT	Ceramic 0.01 µF
C4,5	YF400104FZT	Ceramic 0.1 µF
C6	YF400222XKT	Ceramic 2200 pF
C7	YF400103XKT	Ceramic 0.01 µF
C8	YF400104FZT	Ceramic 0.1 µF
C9,10	YF400103XKT	Ceramic 0.01 µF
C11	ECSF1VE105	Tantalum 1 µF 35V
C12	ECEA0GKS470	Electrolytic 47 µF 4V
C301	ECSF1AE336	Electrolytic 33 µF 10V
C302	YF400390CHJT	Ceramic 39 pF
L1,2	NL32T8R2K	Coil 8.2 µH
CF1	YFELB4L033	Filter
M65	o YFV2HA0378A4	Shield Cover A
M66	o YFV2HA0379A4	Shield Cover B

PROCESS VIC-4 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB5	o YFVKF3260E2A	Printed Circuit Board Assy
IC1	AN608	IC
IC2	AN2020S	IC
Q1	2SC2404-CDTW	Transistor
Q2	2SD601-QR	Transistor
D1,2	1SS108	Diode
R1-3	YF2116202JT	Carbon 2K ohms 1/16W
R5	YF2116102GT	Carbon 1K ohms 1/16W
R6	YF2116202JT	Carbon 2K ohms 1/16W
R7,8	YF2116102GT	Carbon 1K ohms 1/16W
R10	YF2116102GT	Carbon 1K ohms 1/16W
R12,[illegible]	YF2116751JT	Carbon 750 ohms 1/16W
R14	YF2116392JT	Carbon 3.9K ohms 1/16W
R15	YF2116241JT	Carbon 240 ohms 1/16W
R16	YF2116122JT	Carbon 1.2K ohms 1/16W
R17	YF2116202JT	Carbon 2K ohms 1/16W
VR1	YYFH0522A2K	Variable Resistor 2K ohms
C1	ECEA0GKS470	Electrolytic 47 µF 4V
C2	ECEA1CKS220	Electrolytic 22 µF 16V
C3,4	ECEA0GKS470	Electrolytic 47 µF 4V
C5,6	YF400104FZT	Ceramic 0.1 µF
C7	ECEA1AKS330	Electrolytic 33 µF 10V
CF1	YFELB4H026	Filter
CF2	YFELB4K042	Filter
M67	o YFV2HA0380A4	Shield Cover

MICROPROCESSOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB6	o YFVKC3260E1A	Printed Circuit Board Assy
IC1,2	AN90B82S	IC
IC3	M50450FP	IC
IC4	MN1754CVS2	IC
IC5,6	M5224FP	IC
IC7	MN4051BS	IC
IC8	NJM3414M	IC
IC9,10	MN4053BS	IC
IC11	AN6914S	IC
IC12	MN4053BS	IC
IC13	M5223FP	IC
IC14	M51951AMLW	IC
Q1-3	2SD601-QR	Transistor
Q4	2SB709-Q	Transistor
Q5	2SD601-QR	Transistor
Q12	2SC2404-CDTW	Transistor
Q13,14	2SD601-QR	Transistor
Q15	2SB709-Q	Transistor
Q16-18	2SD601-QR	Transistor
Q19	2SB709-Q	Transistor
Q20,21	2SD1030-T	Transistor
Q22	2SC2404-CDTW	Transistor
Q23,24	2SD1030-T	Transistor
Q25	2SB709-Q	Transistor
Q26,27	2SD601-QR	Transistor
Q29	2SD1030-T	Transistor
Q30	2SB709-Q	Transistor
Q31	2SD601-QR	Transistor
Q32,33	2SB709-Q	Transistor
Q34,35	2SD601-QR	Transistor
Q36,37	2SB709-Q	Transistor
Q38	2SD601-QR	Transistor
Q40	2SB709-Q	Transistor
Q41,42	2SD601-QR	Transistor
D1-4	MA151K	Diode
D5	MA165	Diode
D6,7	MA151K	Diode
D8	HZ38LL	Diode
D9-18	MA151K	Diode
D301	HZ9LB-[illegible]	Diode
D302	MA151K	Diode
R1,2	YF2116103JT	Carbon 10K ohms 1/16W
R3,4	YF2116473GT	Carbon 47K ohms 1/16W
R5	YF2116103JT	Carbon 10K ohms 1/16W
R6,7	YF2116473GT	Carbon 47K ohms 1/16W
R8,9	YF2116103JT	Carbon 10K ohms 1/16W
R10	YF2116[illegible]2JT	Carbon 5.6K ohms 1/16W
R11	YF2116474JT	Carbon 470K ohms 1/16W
R12	YF2116114JT	Carbon 110K ohms 1/16W
R13	YF2116223JT	Carbon 22K ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION
R48	YF2116152JT	Carbon 1.5K ohms 1/16W
R49	YF2116391JT	Carbon 390 ohms 1/16W
R50,51	YF2116102GT	Carbon 1K ohms 1/16W
R52	YF2116123JT	Carbon 12K ohms 1/16W
R53	YF2116103JT	Carbon 10K ohms 1/16W
R54	YF2116223JT	Carbon 22K ohms 1/16W
R55	YF2116102GT	Carbon 1K ohms 1/16W
R56,57	YF2116223JT	Carbon 22K ohms 1/16W
R58	YF2116102GT	Carbon 1K ohms 1/16W
R59	YF2116682JT	Carbon 6.8K ohms 1/16W
R60	YF2116272JT	Carbon 2.7K ohms 1/16W
R61	YF2116103JT	Carbon 10K ohms 1/16W
R70	ERD10TJ471	Carbon 470 ohms 1/8W
VR1	YFH0521A220K	Variable Resistor 220K ohms
VR2	YFH0521A1K	Variable Resistor 1K ohms
VR3	YFH0521A2R2K	Variable Resistor 2.2K ohms
VR4	YFH0521A10K	Variable Resistor 10K ohms
C1-3	YF400104FZT	Ceramic 0.1 µF
C4	ECEA0GKS470	Electrolytic 47 µF 4V
C5	YF400104FZT	Ceramic 0.1 µF
C6	YF400222XKT	Ceramic 2200 pF
C7	YF400103XKT	Ceramic 0.01 µF
C8	YF400222XKT	Ceramic 2200 pF
C9-11	ECEA1EKK3R3	Electrolytic 3.3 µF 25V
C12	YF400103XKT	Ceramic 0.01 µF
C13	YF400560CHJT	Ceramic 56 pF
C14	ECEA1AKS330	Electrolytic 33 µF 10V
C15,16	ECSF0JE226	Electrolytic 22 µF 6.3V
C17	YF400104FZT	Ceramic 0.1 µF
C18	ECEA0GKS101	Electrolytic 100 µF 4V
C19	ECEA0GKS470	Electrolytic 47 µF 4V
C20	YF400330CHJT	Ceramic 33 pF
C21	YF400222XKT	Ceramic 2200 pF
C22	YF400560CHJT	Ceramic 56 pF
C23	ECEA0JKS101	Electrolytic 100µF 6.3V
C24-26	YF400104FZT	Ceramic 0.1 µF
C27	ECEA0JKS470	Electrolytic 47 µF 6.3V
C28	YF400222XKT	Ceramic 2200 pF
C29	YF400560CHJT	Ceramic 56 pF
C30,31	YF400820CHJT	Ceramic 82 pF
CT1,2	ECRHC120N11	Trimmer Capacitor 120 pF
L1	NL32T8R2K	Coil 8.2µH
L2	EL05SI390K	Coil 39 µH
L3	YFF3216E8R2K	Coil 8.2 µH

PROCESS VIC-2 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB3	o YFVKD3260E2A	Printed Circuit Board Assy
IC1	NJM2902M	IC
Q1	2SC2405STU	Transistor
Q2,3	2SC2404-CDTW	Transistor
R1	YF2116222GT	Carbon 2.2K ohms 1/16W
R2	YF2116151JT	Carbon 150 ohms 1/16W
R3	YF2116391JT	Carbon 390 ohms 1/16W
R4,5	YF2116681JT	Carbon 680 ohms 1/16W
R6	YF2116112JT	Carbon 1.1K ohms 1/16W
R7	YF2116911JT	Carbon 910 ohms 1/16W
R8	YF2116112JT	Carbon 1.1K ohms 1/16W
R9	YF2116331JT	Carbon 330 ohms 1/16W
R10	YF2116133JT	Carbon 13K ohms 1/16W
R11	YF2116222GT	Carbon 2.2K ohms 1/16W
R12	YF2116103JT	Carbon 10K ohms 1/16W
R13,14	YF2116512JT	Carbon 5.1K ohms 1/16W
R15	YF2116102GT	Carbon 1K ohms 1/16W
R16	YF2116183JT	Carbon 18K ohms 1/16W
R17	YF2116222GT	Carbon 2.2K ohms 1/16W
R18	YF2116103JT	Carbon 10K ohms 1/16W
R19,20	YF2116512JT	Carbon 5.1K ohms 1/16W
R23,24	YF2116103JT	Carbon 10K ohms 1/16W
R25	YF2116203JT	Carbon 20K ohms 1/16W
R26	YF2116133JT	Carbon 13K ohms 1/16W
R27	YF2116273JT	Carbon 27K ohms 1/16W
R28	YF2116163JT	Carbon 16K ohms 1/16W
VR1,2	YFH0522A3R3K	Variable Resistor 3.3K ohms
VR3	YFH0522A6R8K	Variable Resistor 6.8K ohms
VR4	YFH0522A3R3K	Variable Resistor 3.3K ohms
C1	ECEA1AKS330	Electrolytic 33 µF 10V
C2	ECEA0GKS470	Electrolytic 47 µF 4V
C3	ECEA1AKS330	Electrolytic 33 µF 10V
C56	ECSF0JE476	Electrolytic 47 µF 6.3V
CF1	YFELB4N020	Filter
J21,22	YF21160R00T	Jumper Resister

PROCESS VIC-3 A/B BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB4	o YFVKE3260E2A	Printed Circuit Board Assy
IC1	MN3802A	IC
Q1	2SB709-Q	Transistor
Q2	2SD601-QR	Transistor
Q3,4	2SC2404-CDTW	Transistor
Q5	2SD601-QR	Transistor
D301	MA165	Diode
R1	YF2116162JT	Carbon 1.6K ohms 1/16W
R2,3	YF2116561JT	Carbon 560 ohms 1/16W
R4	YF2116512JT	Carbon 5.1K ohms 1/16W
R5	YF2116392JT	Carbon 3.9K ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION	
R14	YF2116103JT	Carbon	10K ohms 1/16W
R15	YF2116223JT	Carbon	22K ohms 1/16W
R16	YF2116203JT	Carbon	20K ohms 1/16W
R17	YF2116103JT	Carbon	10K ohms 1/16W
R18	YF2116303JT	Carbon	30K ohms 1/16W
R19	YF2116101JT	Carbon	100 ohms 1/16W
R20	YF2116272JT	Carbon	2.7K ohms 1/16W
R23,24	YF2116101JT	Carbon	100 ohms 1/16W
R27	YF2116332JT	Carbon	3.3K ohms 1/16W
R28	YF2116101JT	Carbon	100 ohms 1/16W
R30	YF2116332JT	Carbon	3.3K ohms 1/16W
R31	YF2116101JT	Carbon	100 ohms 1/16W
R32	YF2116103JT	Carbon	10K ohms 1/16W
R33	YF2116363JT	Carbon	36K ohms 1/16W
R34	YF2116123JT	Carbon	12K ohms 1/16W
R57	YF2116562JT	Carbon	5.6K ohms 1/16W
R58	YF2116272JT	Carbon	2.7K ohms 1/16W
R59	YF2116333GT	Carbon	33K ohms 1/16W
R60	YF2116750JT	Carbon	75 ohms 1/16W
R61	YF2116273JT	Carbon	27K ohms 1/16W
R62	YF2116303JT	Carbon	30K ohms 1/16W
R63,64	YF2116152JT	Carbon	1.5K ohms 1/16W
R65	YF2116101JT	Carbon	100 ohms 1/16W
R66	YF2116391JT	Carbon	390 ohms 1/16W
R67,68	YF2116103JT	Carbon	10K ohms 1/16W
R69	YF2116222GT	Carbon	2.2K ohms 1/16W
R70	YF2116103JT	Carbon	10K ohms 1/16W
R71	YF2116153JT	Carbon	15K ohms 1/16W
R72	YF2116363JT	Carbon	36K ohms 1/16W
R73	YF2116222GT	Carbon	2.2K ohms 1/16W
R74,75	YF2116223JT	Carbon	22K ohms 1/16W
R76	YF2116103JT	Carbon	10K ohms 1/16W
R77	YF2116473GT	Carbon	47K ohms 1/16W
R78	YF2116103JT	Carbon	10K ohms 1/16W
R79	YF2116333GT	Carbon	33K ohms 1/16W
R80	YF2116103JT	Carbon	10K ohms 1/16W
R81	YF2116104JT	Carbon	100K ohms 1/16W
R82	YF2116225JT	Carbon	2.2M ohms 1/16W
R83	YF2116391JT	Carbon	390 ohms 1/16W
R84	YF2116224JT	Carbon	220K ohms 1/16W
R85	YF2116104JT	Carbon	100K ohms 1/16W
R86	YF2116225JT	Carbon	2.2M ohms 1/16W
R87	YF2116154JT	Carbon	150K ohms 1/16W
R88	YF2116225JT	Carbon	2.2M ohms 1/16W
R89	YF2116103JT	Carbon	10K ohms 1/16W
R90	YF2116223JT	Carbon	22K ohms 1/16W
R91	YF2116222GT	Carbon	2.2K ohms 1/16W
R92	YF2116752GT	Carbon	7.5K ohms 1/16W
R93	YF2116303GT	Carbon	30K ohms 1/16W
R94	YF2116753GT	Carbon	75K ohms 1/16W
R95	YF2116393GT	Carbon	39K ohms 1/16W
R96	YF2116223GT	Carbon	22K ohms 1/16W
R97	YF2116564GT	Carbon	560K ohms 1/16W
R98	YF2116103JT	Carbon	10K ohms 1/16W
R99	YF2116101JT	Carbon	100 ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION	
R104	YF2116152JT	Carbon	1.5K ohms 1/16W
R105	YF2116104JT	Carbon	100K ohms 1/16W
R106	YF2116103JT	Carbon	10K ohms 1/16W
R107	YF2116222GT	Carbon	2.2K ohms 1/16W
R108	YF2116513JT	Carbon	51K ohms 1/16W
R109	YF2116562JT	Carbon	5.6K ohms 1/16W
R110	YF2116333GT	Carbon	33K ohms 1/16W
R111	YF2116154JT	Carbon	150K ohms 1/16W
R112,113	YF2116104JT	Carbon	100K ohms 1/16W
R114	YF2116563JT	Carbon	56K ohms 1/16W
R115	YF2116183JT	Carbon	18K ohms 1/16W
R116,117	YF2116473GT	Carbon	47K ohms 1/16W
R118	YF2116333GT	Carbon	33K ohms 1/16W
R119	YF2116103JT	Carbon	10K ohms 1/16W
R120,121	YF2116152JT	Carbon	1.5K ohms 1/16W
R122	YF2116333GT	Carbon	33K ohms 1/16W
R123	YF2116203JT	Carbon	20K ohms 1/16W
R124	YF2116153JT	Carbon	15K ohms 1/16W
R125	YF2116473GT	Carbon	47K ohms 1/16W
R126	YF2116103JT	Carbon	10K ohms 1/16W
R127	YF2116752JT	Carbon	7.5K ohms 1/16W
R128,129	YF2116103JT	Carbon	10K ohms 1/16W
R130	YF2116752JT	Carbon	7.5K ohms 1/16W
R131	YF2116332JT	Carbon	3.3K ohms 1/16W
R132,133	YF2116333GT	Carbon	33K ohms 1/16W
R134	YF2116332JT	Carbon	3.3K ohms 1/16W
R135	YF2116333GT	Carbon	33K ohms 1/16W
R136	YF2116510JT	Carbon	51 ohms 1/16W
R137	YF2116333GT	Carbon	33K ohms 1/16W
R138	YF2116102GT	Carbon	1K ohms 1/16W
R144-147	YF2116103JT	Carbon	10K ohms 1/16W
R148	YF2116911JT	Carbon	910 ohms 1/16W
R149	YF2116472JT	Carbon	4.7K ohms 1/16W
R150	YF2116103JT	Carbon	10K ohms 1/16W
R200	YF2116473GT	Carbon	47K ohms 1/16W
R201	YF2116563JT	Carbon	56K ohms 1/16W
R202,203	ERD10TJ471	Carbon	470 ohms 1/8W
R301	YF2116223JT	Carbon	22K ohms 1/16W
R302	YF2116103JT	Carbon	10K ohms 1/16W
R303	YF2116332JT	Carbon	3.3K ohms 1/16W
R304	YF2116681JT	Carbon	680 ohms 1/16W
R307	YF2116104JT	Carbon	100K ohms 1/16W
R401	ERD10TJ823	Carbon	82K ohms 1/8W
VR1	YFH0522A6R8K	Variable Resistor	6.8K ohms
VR2	EVND1A00B14	Variable Resistor	10K ohms
Z1	RKM9L154F	Block Resistor	
C1	YF400300SLKT	Ceramic	30 pF
C2	YF400222XKT	Ceramic	2200 pF
C3	ECSF1AE476	Tantalum	47 µF 10V
C4	ECEA1AKS470	Electrolytic	47 µF 10V
C5,7	ECEA1AKS220	Electrolytic	22 µF 10V
C8,9	ECEA1AKS220	Electrolytic	22 µF 10V
C11,12	ECEA1HKS010	Electrolytic	1 µF 50V
C13	ECEA1EKK3R3	Electrolytic	3.3 µF 25V
C14	YF400122SLKT	Ceramic	1200 pF

SYMBOL NO.	PART NO.	DESCRIPTION
C16	ECEA1AKS470	Electrolytic 47 µF 10V
C24	YF400680SLKT	Ceramic 68pF
C25	ECEA1AKK100	Electrolytic 10 µF 10V
C26	ECEA0JKS470	Electrolytic 47 µF 6.3V
C27	YF400121SLKT	Ceramic 120 pF
C28	YF400390CHJT	Ceramic 39 pF
C29	ECEA1AKS220	Electrolytic 22 µF 10V
C30	YF400473FZT	Ceramic 0.047 µF
C32	ECSF1AE476	Tantalum 47 µF 10V
C33	YF400222XKT	Ceramic 2200 pF
C34	YF400102SLKT	Ceramic 1000pF
C35	YF400104FZT	Ceramic 0.1 µF
C36	YF400103FZT	Ceramic 0.01 µF
C37,38	YF400101SLKT	Ceramic 100 pF
C39	ECEA0JK221	Electrolytic 220 µF 6.3V
C40	ECEA1AKS330	Electrolytic 33 µF 10V
C42	ECEA1AKS470	Electrolytic 47 µF 10V
C44	YF400473FZT	Ceramic 0.047 µF
C45	ECQV1H474JZ	Plastic 0.47 µF 50V
C46	YF400271CHJT	Ceramic 270 pF
C47	ECEA0JKS220	Electrolytic 22 µF 6.3V
C48,49	ECEA1AKS470	Electrolytic 47 µF 10V
C50-52	YF400473FZT	Ceramic 0.047 µF
C53	ECEA0GKS470	Electrolytic 47 µF 4V
C54	YF400103FZT	Ceramic 0.01 µF
C55	ECSF1AE476	Tantalum 47 µF 10V
C301	ECEA1HSN010	Electrolytic 1 µF 50V
C302	ECEA0GKS470	Electrolytic 47 µF 4V
C303	ECEA1AKS220	Electrolytic 22 µF 10V
C401	ECEA1CKS100	Electrolytic 10 µF 16V
CT1	ECRHB040E11	Trimmer Capacitor 40 pF
L1	EL05SI101K	Coil 100 µH
L2	EL05SI8R2K	Coil 8.2µH
L3	EL05SI150K	Coil 15 µH
L4	ELE-H102KA	Coil 1000µH
T1	YFVL801	Flyback Transformer
SW1	YFSSS212YK	Slide Switch
X1	YFKF38G	Crystal Oscillator
X2	EF0-FC-8004	Crystal Oscillator
J25,139	YF21160R00T	Jamper Rasistor
J141,143	YF21160R00T	Jumper Rasistor
CN1-JF	YF563330APB	30 pin Jack Female
CN2-JF	YF563332APB	32 pin Jack Female
CN3-JF	YF559712APB	12 pin Jack female
M63	o YFV2HA0381A4	Shield Cover-5
M64	o YFV2HA0382B4	Shield Cover-6

SYMBOL NO.	PART NO.	DESCRIPTION
MICROPROCESSOR VIC-1/VIC-2 BOARD		
PCB7	o YFVKG3260P2A	Printed Circuit Board Assy
Q6-8	2SD601-QR	Transistor
R35	YF2116333GT	Carbon 33K ohms 1/16W
R36	YF2116750JT	Carbon 75 ohms 1/16W
R37	YF2116153JT	Carbon 15K ohms 1/16W
R38	YF2116151JT	Carbon 150 ohms 1/16W
R39	YF2116331JT	Carbon 330 ohms 1/16W
R40	YF2116272JT	Carbon 2.7K ohms 1/16W
R41	YF2116102GT	Carbon 1K ohms 1/16W
R42	YF2116332JT	Carbon 3.3K ohms 1/16W
R43	YF2116103JT	Carbon 10K ohms 1/16W
R44	YF2116223JT	Carbon 22K ohms 1/16W
R45	YF2116472JT	Carbon 4.7K ohms 1/16W
C15,17	ECEA1CKS100	Electrolytic 10 µF 16V
C18	ECEA1CKS100	Electrolytic 10 µF 16V
C19	YF400680SLKT	Ceramic 68 pF
POWER/SYNC BOARD		
PCB8	o YFVKZ3260E7A	Printed Circuit Board Assy
IC1	MN74HC00S	IC
IC2	MN6761S	IC
IC3	MN67602PS	IC
IC4	HB40	IC
IC5	MN74HC74S	IC
IC6	NJM319M	IC
IC7	MN74HC00S	IC
IC8	NJM2048MC	IC
IC9	M5218FP	IC
IC10	NJM3414M	IC
Q4-6	2SB709-Q	Transistor
Q7,8	2SD601-QR	Transistor
Q9	2SC2404-CDTW	Transistor
Q10	2SD602-QRS	Transistor
Q11	2SC3303-0Y	Transistor
Q12,13	2SB837-CD	Transistor
Q14	2SD601-QR	Transistor
Q16	2SD1266	Transistor
Q15	2SB970-QRS	Transistor
Q17	2SB710-Q	Transistor
Q18-20	2SC2404-CDTW	Transistor
Q200	2SC2404-CDTW	Transistor
D5	1SV153	Diode
D8,9	MA151K	Diode
D10	MA170	Diode
D11,12	EU01A	Diode
D13	RD9.1EB3	Diode
D14	RD18EB3	Diode
D15,16	EK14	Diode
D17	MA151K	Diode

SYMBOL NO.	PART NO.	DESCRIPTION	
R1	YF2116561JT	Carbon	560 ohms 1/16W
R3	YF2116223JT	Carbon	22K ohms 1/16W
R4	YF2116561JT	Carbon	560 ohms 1/16W
R6	YF2116683JT	Carbon	68K ohms 1/16W
R18	YF2116104JT	Carbon	100K ohms 1/16W
R19,20	YF2116102GT	Carbon	1K ohms 1/16W
R21	YF2116752JT	Carbon	7.5K ohms 1/16W
R27,29	YF2116102GT	Carbon	1K ohms 1/16W
R30,32	YF2116102GT	Carbon	1K ohms 1/16W
R33	YF2116182JT	Carbon	1.8K ohms 1/16W
R34-36	YF2116562JT	Carbon	5.6K ohms 1/16W
R37-39	YF2116103JT	Carbon	10K ohms 1/16W
R40	YF2116223JT	Carbon	22K ohms 1/16W
R41,42	YF2116103JT	Carbon	10K ohms 1/16W
R43	YF2116152JT	Carbon	1.5K ohms 1/16W
R44	YF2116622JT	Carbon	6.2K ohms 1/16W
R45,46	YF2116102GT	Carbon	1K ohms 1/16W
R47	YF2116104JT	Carbon	100K ohms 1/16W
R48	YF2116102GT	Carbon	1K ohms 1/16W
R49	YF2116393JT	Carbon	39K ohms 1/16W
R50	YF2116152JT	Carbon	1.5K ohms 1/16W
R51	YF2116333GT	Carbon	33K ohms 1/16W
R52	YF2116683JT	Carbon	68K ohms 1/16W
R53	YF2116223JT	Carbon	22K ohms 1/16W
R54	YF2116103JT	Carbon	10K ohms 1/16W
R55	YF2116562JT	Carbon	5.6K ohms 1/16W
R56-59	YF2116103JT	Carbon	10K ohms 1/16W
R60	YF2116223JT	Carbon	22K ohms 1/16W
R61	YF2116333GT	Carbon	33K ohms 1/16W
R62	YF2116223JT	Carbon	22K ohms 1/16W
R63	YF2116103JT	Carbon	10K ohms 1/16W
R64	YF2116621JT	Carbon	620 ohms 1/16W
R65	YF2116471JT	Carbon	470 ohms 1/16W
R67	YF2116202JT	Carbon	2K ohms 1/16W
R68	YF2116332JT	Carbon	3.3K ohms 1/16W
R69	YF2116301JT	Carbon	300 ohms 1/16W
R70	YF2116821GT	Carbon	820 ohms 1/16W
R71	YF2116132JT	Carbon	1.3K ohms 1/16W
R72	YF2116681JT	Carbon	680 ohms 1/16W
R73	YF2116152JT	Carbon	1.5K ohms 1/16W
R74	YF2116153JT	Carbon	15K ohms 1/16W
R75	YF2116333GT	Carbon	33K ohms 1/16W
R76	YF2116472JT	Carbon	4.7K ohms 1/16W
R77	YF2116153JT	Carbon	15K ohms 1/16W
R78	YF2116562GT	Carbon	5.6K ohms 1/16W
R79	YF2116512GT	Carbon	5.1K ohms 1/16W
R80	YF2116152JT	Carbon	1.5K ohms 1/16W
R81,82	YF2116512GT	Carbon	5.1K ohms 1/16W
R83	YF2116302GT	Carbon	3K ohms 1/16W
R84	YF2116182GT	Carbon	1.8K ohms 1/16W
R85	YF2116562JT	Carbon	5.6K ohms 1/16W
R86	YF2116153JT	Carbon	15K ohms 1/16W
R87	YF2116100JT	Carbon	10 ohms 1/16W
R88,89	YF2116203JT	Carbon	20K ohms 1/16W
R90	YF2116102GT	Carbon	1K ohms 1/16W
R91-94	YF2116223JT	Carbon	22K ohms 1/16W
R95	YF2116101JT	Carbon	100 ohms 1/16W
R96	YF2116102GT	Carbon	1K ohms 1/16W
R97	YF2116222GT	Carbon	2.2K ohms 1/16W
R98	YF2116750JT	Carbon	75 ohms 1/16W
R99	YF2116103JT	Carbon	10K ohms 1/16W
R100	YF2116133JT	Carbon	13K ohms 1/16W
R104	YF2116223JT	Carbon	22K ohms 1/16W
R105	YF2116101JT	Carbon	100 ohms 1/16W
R106	YF2116102GT	Carbon	1K ohms 1/16W
R107,108	YF2116473GT	Carbon	47K ohms 1/16W
R109	YF2116103JT	Carbon	10K ohms 1/16W
R110	YF2116561JT	Carbon	560 ohms 1/16W
R111	YF2116102GT	Carbon	1K ohms 1/16W
R112	YF2116103JT	Carbon	10K ohms 1/16W
R114	YF2116162JT	Carbon	1.6K ohms 1/16W
R121	YF2116822JT	Carbon	8.2K ohms 1/16W
R200	YF2116333GT	Carbon	33K ohms 1/16W
VR1	EVND1AA00815	Variable Resistor	100K ohms
VR2,3	EVND1AA00BS3	Variable Resistor	68K ohms
C1	YF400470SLKT	Ceramic	47 pF
C2	YF400103FZT	Ceramic	0.01 µF
C3	YF400200CHJT	Ceramic	20 pF
C5	ECEA1AU470	Electrolytic	47 µF 10V
C9	YF400470SLKT	Ceramic	47 pF
C11,12	ECSF1AE106	Tantalum	10 µF 10V
C17	YF400103FZT	Ceramic	0.01 µF
C19	YF400150CHJT	Ceramic	15 pF
C20	ECSF1AE106	Tantalum	10 µF 10V
C21	YF400181CHJT	Ceramic	180 pF
C26	ECSF1AE106	Tantalum	10 µF 10V
C27	ECEA1AU470	Electrolytic	47 µF 10V
C28	YF400200CHJT	Ceramic	20 pF
C29	ECEA1AU470	Electrolytic	47 µF 10V
C31,32	YF400470SLKT	Ceramic	47 pF
C33	YF400471SLKT	Ceramic	470P pF
C34,35	YF400470SLKT	Ceramic	47 pF
C36	YF400471SLKT	Ceramic	470pF
C38	YF400100CHDT	Ceramic	10 pF
C39	YF400221CHJT	Ceramic	220 pF
C40,41	ECEA1AU470	Electrolytic	47 µF 10V
C42	ECEA1AKN470	Electrolytic	47 µF 10V
C43	ECEA0JU101	Electrolytic	100 µF 6.3V
C44	ECEA1AKK100	Electrolytic	10 µF 10V
C45	ECEA1HKS010	Electrolytic	1 µF 50V
C46	ECSF1AE106	Tantalum	10 µF 10V
C47	ECEA1AU470	Electrolytic	47 µF 10V
C49	ECEA1AU101	Electrolytic	100 µF 10V
C50	YF400104FZT	Ceramic	0.1 µF
C51	YF400102FZT	Ceramic	1000 pF
C52	ECEA1AU221	Electrolytic	220 µF 10V
C53	YF400272XKT	Ceramic	2700 pF

SYMBOL NO.	PART NO.	DESCRIPTION	
C54	ECEA1EU101	Electrolytic	100 µF 25V
C55	ECEA1CU101	Electrolytic	100 µF 16V
C56	ECEA1EU101	Electrolytic	100 µF 25V
C57	ECEA1CU101	Electrolytic	100 µF 16V
C58	ECEA1EKS100	Electrolytic	10µF 25V
C59	ECEA1EF330	Electrolytic	33 µF 25V
C60,61	YF400102FZT	Ceramic	1000 pF
C62	ECEA1AF101	Electrolytic	100 µF 10V
C63	ECEA1AFE181	Electrolytic	180 µF 10V
C64	ECEA1AF101	Electrolytic	100 µF 10V
C65	ECEA1AFE181	Electrolytic	180 µF 10V
C67	ECEA1AF101	Electrolytic	100 µF 10V
C68	YF400103FZT	Ceramic	0.01 µF
C69	YF426821CHJS	Ceramic	820 pF 50V
C70	ECEA0JKS470	Electrolytic	47 µF 6.3V
C71	YF400102FZT	Ceramic	1000 pF
C72	ECEA1AKS220	Electrolytic	22 µF 10V
C73	ECEA1AU470	Electrolytic	47 µF 10V
C74	YF400103FZT	Ceramic	0.01 µF
C75	ECEA1AU470	Electrolytic	47 µF 10V
C76	ECEA0JKS220	Electrolytic	22 µF 6.3V
C78	YF400331CHJT	Ceramic	330 pF
C79	ECEA1AU470	Electrolytic	47 µF 10V
C80	ECEA1HKS2R2	Electrolytic	2.2 µF 50V
C81	ECEA1AKS220	Electrolytic	22 µF 10V
C82	ECEA0JKK100	Electrolytic	10 µF 6.3V
C83	YF400181CHJT	Ceramic	180 pF
C84	YF400333FZT	Ceramic	0.033 µF
C85	YF400200CHJT	Ceramic	20 pF
C86	YF400333FZT	Ceramic	0.033 µF
C87	ECEA0JU471	Electrolytic	470 µF 6.3V
C88	ECEA0JKS470	Electrolytic	47 µF 6.3V
C200	YF400120CHJT	Ceramic	CHIP 12pF CH
C301	ECEA1EU471	Electrolytic	470 µF 25V
C302	ECSF1CE107	Tantalum	100 µF 16V
L1,2	NL32T8R2K	Coil	8.2 µH
L4,6	NL32T8R2K	Coil	8.2 µH
L7	NL32T8R2K	Coil	8.2 µH
L8	ELC08G010	Coil	100 µH
L9,10	EL05SI221K	Coil	220 µH
L11	ELC08G010	Coil	100 µH
L12	Y[illegible]391KA	Coil	390 µH
L13	YFLH10381µHA	Coil	380 µH
L14	ELC08G010	Coil	100 µH
L16	EL05SI8R2K	Coil	8.2 µH
L17	YFNL45T8R2K	Coil	8.2 µH
L19	EL05SI8R2K	Coil	8.2 µH
T1	YFETE13K34AY	Power Transformer	
SW	YWSSF-012M	Slide Switch	
SW1	YFSSS212YK	Slide Switch	
X2	YFMS30917M10	Crystal Oscillator	
F1	YFICP-F25	Current Fuse	
F2,3	YFICP-F20	Current Fuse	0.8A

SYMBOL NO.	PART NO.	DESCRIPTION	
J5,7	YF21160R00T	Jumper Resistor	
J28,31	YF21160R00T	Jumper Resistor	
J66,115	YF21160R00T	Jumper Resistor	
J116	YF21160R00T	Jumper Resistor	
CN1-JF	YF563330APB	30 pin Jack Female	
CN2-JF	YF563322APB	22 pin Jack Female	
M71	YFV2HA0383A4	Shield Cover-11	
M72	o YFV2HA0384B4	Shield Cover-12	
M73	o YFV2HA0388B4	Shield Cover-13	
M74	o YFV2HA0389A4	Shield Cover-14	
M75	o YFV2HA0390A4	Shield Cover-15	
M76	o YFV2HA0391B3	Shield Cover-16	
M77	o YFV2HA0392A4	Shield Cover-17	
M88	o YFV2PA0176A4	Insulator Paper	

POWER/SYNC VIC-1 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB9	o YFVKH3260E2A	Printed Circuit Board Assy	
Q1	2SK198-Q	FET	
D1,2	1SV153	Diode	
R7	YF2116332JT	Carbon	3.3K ohms 1/16W
R8	YF2116103JT	Carbon	10K ohms 1/16W
R9	YF2116102GT	Carbon	1K ohms 1/16W
R10	YF2116433JT	Carbon	43K ohms 1/16W
R11	YF2116103JT	Carbon	10K ohms 1/16W
R12	YF2116562JT	Carbon	5.6K ohms 1/16W
R102,103	YF2116104JT	Carbon	100K ohms 1/16W
C6	ECEA1EKK2R2	Electrolytic	2.2 µF 25V
C7	YF400682XKT	Ceramic	6800 pF
C8,10	YF400331CHJT	Ceramic	330 pF
L3	F051067	Coil	
M78	o YFV2HA0393B4	Shield Cover-18	
M79	o YFV2HA0394A4	Shield Cover-19	

POWER/SYNC VIC-2 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB10	o YFVKI3260E2A	Printed Circuit Board Assy	
Q2	2SK198-Q	FET	
D3,4	1SV153	Diode	
R13	YF2116220JT	Carbon	22 ohms 1/16W
R14	YF2116102GT	Carbon	1K ohms 1/16W
R15	YF2116224JT	Carbon	220K ohms 1/16W
R16,17	YF2116104JT	Carbon	100K ohms 1/16W
R18	-2116302JT	Carbon	3K ohms 1/16W
C13	YF400393FZT	Ceramic	0.039 µF
C14	YF400101CHJT	Ceramic	100 pF
C15,16	YF400331CHJT	Ceramic	330 pF
X1	YFMS30917M10	Crystal Oscillator	

SYMBOL NO.	PART NO.	DESCRIPTION	

POWER/SYNC VIC-3 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB11	o YFVKK3260E2A	Printed Circuit Board Assy	
Q1	2SK198-Q	FET	
D1,2	1SV153	Diode	
R7	YF2116332JT	Carbon	3.3K ohms 1/16W
R8	YF2116103JT	Carbon	10K ohms 1/16W
R9	YF2116102GT	Carbon	1K ohms 1/16W
R10	YF2116752JT	Carbon	7.5K ohms 1/16W
R11	YF2116103JT	Carbon	10K ohms 1/16W
R12	YF2116562JT	Carbon	5.6K ohms 1/16W
C6	ECEA1EKK2R2	Electrolytic	2.2 µF 25V
C7	YF400102FZT	Ceramic	1000 pF
C8,10	YF400331CHJT	Ceramic	330 pF
L3	YFF051067	Coil	

CCD BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB12	o YFVKB3260E2A	Printed Circuit Board Assy	
IC2	CX80026M	IC	
Q1	2SC2404-CDTW	Transistor	
Q2,3	2SA1022-CTW	Transistor	
Q4,5	2SC2404-CDTW	Transistor	
D1	MA151K	Diode	
D2	MA151WA	Diode	
R2	YF2116101JT	Carbon	100 ohms 1/16W
R3	YF2116222GT	Carbon	2.2K ohms 1/16W
R4	YF2116562JT	Carbon	5.6K ohms 1/16W
R5,6	YF2116222GT	Carbon	2.2K ohms 1/16W
R7	YF2116514JT	Carbon	510K ohms 1/16W
R10	YF2116330JT	Carbon	33 ohms 1/16W
R11	YF2116101JT	Carbon	100 ohms 1/16W
R12	YF2116432JT	Carbon	4.3K ohms 1/16W
R13,14	YF2116101JT	Carbon	100 ohms 1/16W
R17,18	YF2116514JT	Carbon	510K ohms 1/16W
R19	YF2116392JT	Carbon	3.9K ohms 1/16W
R20	YF2116332JT	Carbon	3.3K ohms 1/16W
C1	ECSF1EE106	Electrolytic	10 µF 25V
C2	ECSF1CE106	Electrolytic	10 µF 16V
C4	YF400473FZT	Ceramic	0.047 µF
C5,7	YF400222XKT	Ceramic	2200 pF
C9	YF400103FZT	Ceramic	0.01 µF
C10	YF400183XKT	Ceramic	0.018 µF
C11	YF400270CHJT	Ceramic	27 pF
C12	YF400473FZT	Ceramic	0.047 µF
C13	YF400560SLJT	Ceramic	56 pF
C14,15	YF400473FZT	Ceramic	0.047 µF
C18,19	YF400473FZT	Ceramic	0.047 µF
C20	YF400682XKT	Ceramic	6800pF
C21	YF400473FZT	Ceramic	0.047 µF
C22	YF400103FZT	Ceramic	0.01 µF
C23,24	YF400682XKT	Ceramic	6800 pF
C25	YF400473FZT	Ceramic	0.047 µF
J1,8	YF21160R00T	Jamper Resistor	
J9,15	YF21160R00T	Jumper Resistor	
J16	YF21160R00T	Jumper Resistor	
E1	o YFF10F1A	Flexible Jumper	
CN1-JM	YFFPC18SS1L1	18 pin Jack Male	

CCD DRIVE BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB13	o YFVKY3260E1A	Printed Circuit Board Assy	
IC1	MN51007LVH	IC	
IC2	UPD6146G	IC	
IC3	MN50003LVE	IC	
IC5	MN74HC08S	IC	
IC6	M51266FP	IC	
IC7	YFNJM2930L05	IC	
Q1	2SD601-QR	Transistor	
Q2	2SB710-Q	Transistor	
Q3	2SD601-QR	Transistor	
Q4-6	2SD602-QRS	Transistor	
Q7	2SB710-Q	Transistor	
Q8	2SD973A-RS	Transistor	
Q9	2SK198-Q	FET	
Q10	2SD602-QRS	Transistor	
D1	MA151K	Diode	
D2,3	1SV153	Diode	
D5	MA151WA	Diode	
R1-4	YF2116102GT	Carbon	1K ohms 1/16W
R5	YF2116561JT	Carbon	560 ohms 1/16W
R6,7	YF2116102GT	Carbon	1K ohms 1/16W
R9	YF2116102GT	Carbon	1K ohms 1/16W
R14	YF2116912JT	Carbon	9.1K ohms 1/16W
R15	YF2116512JT	Carbon	5.1K ohms 1/16W
R16	YF2116102GT	Carbon	1K ohms 1/16W
R17,18	YF2116104JT	Carbon	100K ohms 1/16W
R20,21	YF2116104JT	Carbon	100K ohms 1/16W
R23	YF2116104JT	Carbon	100K ohms 1/16W
R24-27	YF2116102GT	Carbon	1K ohms 1/16W
R30	YF2116104JT	Carbon	100K ohms 1/16W
R31	YF2116392JT	Carbon	3.9K ohms 1/16W
R33	YF2116561JT	Carbon	560 ohms 1/16W
R34	YF2116330JT	Carbon	33 ohms 1/16W
R35	YF2116561JT	Carbon	560 ohms 1/16W
R36	YF2116330JT	Carbon	33 ohms 1/16W
R37	YF2116303JT	Carbon	30K ohms 1/16W
R38	YF2116104JT	Carbon	100K ohms 1/16W
R39	YF2116333GT	Carbon	33K ohms 1/16W
R40	YF2116683JT	Carbon	68K ohms 1/16W
R41	YF2116333GT	Carbon	33K ohms 1/16W
R42	YF2116103JT	Carbon	10K ohms 1/16W
R44	YF2116101JT	Carbon	100 ohms 1/16W
R46	YF2116104JT	Carbon	100K ohms 1/16W
R47	YF2116332JT	Carbon	3.3K ohms 1/16W
R48	YF2116472JT	Carbon	4.7K ohms 1/16W
R49	YF2116432JT	Carbon	4.3K ohms 1/16W
R50,51	YF2116182JT	Carbon	1.8K ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION
R51	YF2116362JT	Carbon 3.6K ohms 1/16W
R52	YF2116562JT	Carbon 5.6K ohms 1/16W
R53	YF2116101JT	Carbon 100 ohms 1/16W
R54	YF2116102GT	Carbon 1K ohms 1/16W
R55,56	YF2116103JT	Carbon 10K ohms 1/16W
R57,58	YF2116331JT	Carbon 330 ohms 1/16W
R59	YF2116102GT	Carbon 1K ohms 1/16W
R60	YF2116223JT	Carbon 22K ohms 1/16W
R61	YF2116562JT	Carbon 5.6K ohms 1/16W
R62-64	YF2116102GT	Carbon 1K ohms 1/16W
R65,66	YF2116101JT	Carbon 100 ohms 1/16W
R67	YF2116221JT	Carbon 220 ohms 1/16W
R68	YF2116392JT	Carbon 3.9K ohms 1/16W
R69	YF2116432JT	Carbon 4.3K ohms 1/16W
R70	YF2116511JT	Carbon 510 ohms 1/16W
R71	YF2116152JT	Carbon 1.5K ohms 1/16W
R72	YF2116512JT	Carbon 5.1K ohms 1/16W
R73	YF2116102GT	Carbon 1K ohms 1/16W
R74	YF2116272JT	Carbon 2.7K ohms 1/16W
R75	YFLP16332J56	Carbon 3.3K ohms1/16W
R76	YF2116104JT	Carbon 100K ohms 1/16W
R77	YF2116362JT	Carbon 3.6K ohms 1/16W
R78	YF2116562JT	Carbon 5.6K ohms 1/16W
VR1	YFH0522A220K	Variable Resistor 220K ohms
VR2	YFH0522A100K	Variable Resistor 100K ohms
VR3	YFH0522A10K	Variable Resistor 10K ohms
VR4	RJ-4WS104	Variable Resistor 100K ohms
VR5	RJ-4WS503	Variable Resistor 50K ohms
C1-6	YF400470SLKT	Ceramic 47 pF
C7	YF400223FZT	Ceramic 0.022 µF
C9	YF400330SLKT	Ceramic 33 pF
C11	YF400470SLKT	Ceramic 47 pF
C12,13	ECSF1AE106	Tantalum 10 µF 10V
C14	YF400103FZT	Ceramic 0.01 µF
C15,16	ECEA1CKK4R7	Electrolytic 4.7 µF 16V
C17	ECEA1EKS4R7	Electrolytic 4.7 µF 25V
C18	YF400473FZT	Ceramic 0.047 µF
C19	YF400103FZT	Ceramic 0.01 µF
C20	ECEA1EKS4R7	Electrolytic 4.7 µF 25V
C21	ECEA1AKK100	Electrolytic 10 µF 10V
C22	ECEA1CKK4R7	Electrolytic 4.7 µF 16V
C23	YF400473FZT	Ceramic 0.047 µF
C24,25	YF400560CHJT	Ceramic 56 pF
C27	YF400390SLKT	Ceramic 39P
C28	ECEA1AKK100	Electrolytic 10 µF 10V
C29	YF400332XKT	Ceramic 3300 pF
C30-32	YF400101SLKT	Ceramic 100 pF
C33	ECSF1AE106	Tantalum 10 µF 10V
C34	YF400103FZT	Ceramic 0.01 µF
C36	YF400220SLKT	Ceramic 22 pF
C37	ECSF1AE106	Tantalum 10 µF 10V
C38	YF400103FZT	Ceramic 0.01 µF
C39	YF400473FZT	Ceramic 0.047 µF

SYMBOL NO.	PART NO.	DESCRIPTION
C40	YF400820SLKT	Ceramic 82 pF
C41	ECSF1AE106	Tantalum 10 µF 10V
C42-44	YF400473FZT	Ceramic 0.047 µF
C45,46	ECSF1AE106	Tantalum 10 µF 10V
C47	YF400470SLKT	Ceramic 47 pF
C49	ECSF1AE106	Tantalum 10 µF 10V
C50	ECEA1AKK100	Electrolytic 10 µF 10V
C51,52	YF400223FZT	Ceramic 0.022 µF
C53	ECEA1EKS100	Electrolytic 10µF 25V
C54	ECSF1AE106	Tantalum 10 µF 10V
C55,56	ECSF1CE106	Tantalum 10 µF 16V
C57	ECEA1AKK100	Electrolytic 10 µF 10V
C302	ECSF1AE106	Tantalum 10 µF 10V
L1	YFF3216A2R2K	Coil 2.2 µH
L3-6	ELJFA2R2KF	Coil 2.2 µH
L7	YFF051070	Coil
L8-10	YFF3216A2R2K	Coil 2.2 µH
L11,13	YFF3216E8R2K	Coil 8.2 µH
J19,28	YF21160R00T	Jumper Resistor
J32	YF21160R00T	Jumper Resistor
CN1-JF	YF563320APB	20 pin Jack Female
CN2-JF	YFFPC18SS1L1	18 pin Jack Female
CN3-JM	EMCS0250ZL	2 pin Jack Male
M81	o YFV2HA0369A4	Shield Cover-7
M82	o YFV2HA0370A4	Shield Cover-8
M83	o YFV2HA0371A4	Shield Cover-9

MOTHER BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB14	o YFVKZ3260P1A	Printed Circuit Board Assy
D1	MA165	Diode
SW1	YFSSS222YK	Slide Switch
F1 ⚠	YFSP520NM0	Current Fuse 2A 125V
E2	YFF10F2A	Flexible Jumper
CN1-JF	YF553220B	20 pin JackFemale
CN2,3-JF	YF553230B	30 pin Jack Female
CN4-JM	YFS10PS2T2EF	10 pin Jack Male
CN5-JM	EMCS1050Z	10 pin Jack Male
CN6-JF	YF553232B	32 pin JackFemale
CN7-JF	YF553230B	30 pin Jack Female
CN8-JM	EMCS0850Z	8 pin Jack Male
CN9-JM	EMCS0250Z	2 pin Jack Male
CN10-JM	EMCS0350Z	3 pin Jack Male
CN11-JM	EMCS0550Z	5 pin Jack Male
CN12-JF	YF553222B	22 pin Jack Female
CN13-JF	YF553230B	30 pin Jack Female
CN14-JF	YF8272332116	32 pin Jack Female
CN15-JF	YF559720CPB	20 pin Jack Female
CN16-JF	YF559719CPB	19 pin Jack Female
M70	o YFV2HA0398A3	Shield Case-4

CONTROL BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB15	o YFVKC3260P3A	Printed Circuit Board Assy
D1	LN26RP	LED
R1	YF2116392JT	Carbon 3.9K ohms 1/16W
R2	YF2116152JT	Carbon 1.5K ohms 1/16W
R3	YF2116183JT	Carbon 18K ohms 1/16W
R4	YF2116563JT	Carbon 56K ohms 1/16W
R5	YF2116102GT	Carbon 1K ohms 1/16W
VR1	YFVA0607V203	Variable Resistor 20K ohms
VR2	YFRK811A5KB	Variable Resistor 5K ohms
SW1	YWSSS21200	Slide Switch
SW2	YFSSS223A	Slide Switch
SW3	YWSSS21200	Slide Switch
SW4	YFEVQQVU04W	Push Switch
J1,2	YF21160R00T	Jumper Resistor
CN1-JM	YFY10S15L2EF	10 pin Jack Male

ATW CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB16	o YFVKZ3260P5A	Printed Circuit Board Assy
E8	o YFF10F5A	Flexible Jumper
CN8-JF	YF69346104	10 pin Jack Female

ATW VIC-1 BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB17	o YFVKJ3260P2A	Printed Circuit Board Assy
IC1-3	M5223FP	IC
R1,2	EROS2CKF2001	Metal 2k ohms 2W
R3,4	YF2116333GT	Carbon 33K ohms 1/16W
R5,6	YFLP162KG202	Carbon 2K ohms 2000PPM
R7,8	YF2116333GT	Carbon 33K ohms 1/16W
R9	YFLP1610KJT5	Carbon 4000PPM 10K ohms
R10	YF2116103JT	Carbon 10K ohms 1/16W
R11	YF2116363JT	Carbon 36K ohms 1/16W
R12	YF2116153JT	Carbon 15K ohms 1/16W
R13	YF2116363JT	Carbon 36K ohms 1/16W
R14	YF2116153JT	Carbon 15K ohms 1/16W
R15	YF2116103GT	Carbon 10K ohms 1/16W
R16	YF2116273GT	Carbon 27K ohms 1/16W
R17	YF2116133JT	Carbon 13K ohms 1/16W
R18	YF2116912GT	Carbon 9.1K ohms 1/16W
R19	YF2116433GT	Carbon 43K ohms 1/16W
R20	YF2116133JT	Carbon 13K ohms 1/16W
VR1	YFH0522A10K	Variable Resistor 10K ohms
VR2,3	YFH0522A22K	Variable Resistor 22K ohms
C1	ECEA1AKS220	Electrolytic 22 µF 10V
C2,3	ECEA0GKK220	Electrolytic 22 µF 4V
C4	YF400104FZT	Ceramic 0.1 µF
J1	YF21160R00T	Jumper Resistor
CN1-JF	YF559708APB	8 pin Jack Female

AUDIO BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB18	o YFVKB3260P3A	Printed Circuit Board Assy
IC1,2	NJM4558MD	IC
IC3	NJM3415M	IC
Q1	2SC2405STU	Transistor
Q2	2SD601-Q	Transistor
Q3	2SC2405STU	Transistor
Q4	2SD601-Q	Transistor
Q5	2SD601-QR	Transistor
Q6	2SB709-Q	Transistor
Q7	2SD601-QR	Transistor
Q8	2SB709-Q	Transistor
Q9	2SD601-QR	Transistor
D1,2	MA165	Diode
D4,301	MA165	Diode
R1,2	YF2116681JT	Carbon 680 ohms 1/16W
R3,4	YF2116822JT	Carbon 8.2K ohms 1/16W
R5	YF2116103JT	Carbon 10K ohms 1/16W
R6	YF2116223JT	Carbon 22K ohms 1/16W
R7	YF2116272JT	Carbon 2.7K ohms 1/16W
R8	YF2116123JT	Carbon 12K ohms 1/16W
R9	YF2116102GT	Carbon 1K ohms 1/16W
R10	YF2116332JT	Carbon 3.3K ohms 1/16W
R11	YF2116473GT	Carbon 47K ohms 1/16W
R12	YF2116223JT	Carbon 22K ohms 1/16W
R13	YF2116102GT	Carbon 1K ohms 1/16W
R14	YF2116104JT	Carbon 100K ohms 1/16W
R15	YF2116223JT	Carbon 22K ohms 1/16W
R16	YF2116103JT	Carbon 10K ohms 1/16W
R17	YF2116272JT	Carbon 2.7K ohms 1/16W
R18	YF2116123JT	Carbon 12K ohms 1/16W
R19	YF2116102GT	Carbon 1K ohms 1/16W
R20	YF2116332JT	Carbon 3.3K ohms 1/16W
R21	YF2116473GT	Carbon 47K ohms 1/16W
R22	YF2116223JT	Carbon 22K ohms 1/16W
R23	YF2116102GT	Carbon 1K ohms 1/16W
R24	YF2116104JT	Carbon 100K ohms 1/16W
R25	YF2116332JT	Carbon 3.3K ohms 1/16W
R26	YF2116122JT	Carbon 1.2K ohms 1/16W
R27	YF2116102GT	Carbon 1K ohms 1/16W
R28	YF2116470JT	Carbon 47 ohms 1/16W
R29,30	YF2116101JT	Carbon 100 ohms 1/16W
R31,32	YF2116103JT	Carbon 10K ohms 1/16W
R33,34	YF2116392JT	Carbon 3.9K ohms 1/16W
R35,36	YF2116752JT	Carbon 7.5K ohms 1/16W
R37,38	YF21158R2JT	Carbon 8.2 ohms 1/16W
R39	YF2116104JT	Carbon 100K ohms 1/16W
R40	YF2116392JT	Carbon 3.9K ohms 1/16W
R41	YF2116750JT	Carbon 75 ohms 1/16W
R42	YF2116103JT	Carbon 10K ohms 1/16W
R43	YF2116333GT	Carbon 33K ohms 1/16W
R44	YF2116103JT	Carbon 10K ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION	
R45	YF2116333GT	Carbon	33K ohms 1/16W
R46	YF2116103JT	Carbon	10K ohms 1/16W
R47	YF2116333GT	Carbon	33K ohms 1/16W
R48	YF2116103JT	Carbon	10K ohms 1/16W
R49	YF2116333GT	Carbon	33K ohms 1/16W
R50, 51	YF2116102GT	Carbon	1K ohms 1/16W
R52	ERD10TJ102	Carbon	1K ohms 1/8W
R53	YF2116102GT	Carbon	1K ohms 1/16W
R301	ERD10TJ222	Carbon	2.2K ohms 1/8W
R302	ERD10TJ03	Carbon	10K ohms 1/8W
VR1, 2	EVN5AG00814	Variable Resistor	10K ohms
C1, 2	ECEA0JKS101	Electrolytic	100 µF 6.3V
C3	ECQV1H473JZW	Plastic	0.047 µF 50V
C4	YF400103XMT	Ceramic	0.01 µF
C5	ECEA0JKS470	Electrolytic	47 µF 6.3V
C6	ECEA1ASN100	Electrolytic	10 µF 10V
C7	YF400102XMT	Ceramic	1000 pF
C8	YF400680CHJT	Ceramic	68 pF
C9	ECEAHSN010	Electrolytic	1 µF 50V
C10	YF426224FZS	Ceramic	0.22 µF 50V
C11	YF400102XMT	Ceramic	1000 pF
C12	YF400151CHJT	Ceramic	150 pF
C13	ECEA1HKS010	Electrolytic	1 µF 50V
C14	ECQV1H473JZW	Plastic	0.047 µF 50V
C15	?YF400103XMT	Ceramic	68 pF
C16	ECEA0JKS470	Electrolytic	47 µF 6..3V
C17	ECEA1ASN100	Electrolytic	10 µF 10V
C18	YF400102XMT	Ceramic	1000 pF
C19	ECEA1HSN010	Electrolytic	1 µF 50V
C20	YF400680CHJT	Ceramic	68 pF
C21	YF426224FZS	Ceramic	0.22 µF 50V
C22	YF400102XMT	Ceramic	1000 pF
C23	YF400151CHJT	Ceramic	150 pF
C24	ECEA1HKS010	Electrolytic	1 µF 50V
C25, 26	ECEA1AKS470	Electrolytic	47 µF 10V
C27	YF400102XMT	Ceramic	1000 pF
C28	ECEA1AU221	Electrolytic	220 µF 10V
C29, 30	ECEA0JKS470	Electrolytic	47 µF 6.3V
C31, 32	YF400473FZT	Ceramic	0.047µ F
C34-36	YF426224FZS	Ceramic	0.22 µF 50V
C37	ECEA0JN221S	Electrolytic	220 µF 6.3V
C301	ECQV1H224JZ	Plastic	0.22 µF 50V
SW1	YWSSS322	Slide Switch	
SW2	YFSSB022L6ND	Slide Switch	
J1-7	ERD25TC0	Jumper Resistor	
J8-18	YF21160R00T	Jumper Resistor	
JK1, 2	YFM0JB21M	Jack	
JK3,4	YFM0JB19M	Jack	
CN1-JM	EMCS0350Z	3 pin Jack Male	
CN2-JM	EMCS0250Z	2 pin Jack Male	
CN3-JM	YF5597-19CPB	19 pin Jack Female	
E2	YFF10F2A	Flexible Jumper	

SYMBOL NO.	PART NO.	DESCRIPTION
ACCESSORY PARTS/PACKAGING PARTS		
BATT1	UM-4NEPBARA	Battery for WVP-F10E, WVP-F10EB, WVP-F10EG
	UM-4NBBARA	Battery for WVP-F10N, WVP-F10NA
M160	o YFV8QA1100AN	Operaitng Instruction for WVP-F10E Series
	o YFV8QA1101AN	Operating Instruction for WVP-F10NA
	o YFV8QA1102AN	Operating Instruction for WVP-F10N
M161	19998700331	Warranty Card for WVP-F10EB
	19995700419	Warranty Card for WVP-F10EG
	YFV8UA0004A4	Warranty Card for WVP-F10NA
M162	YWV22XPRB99K	Service Center List
M163	YFV8SA0009CN	Safety Card
M164	XZB26X40C05	Polyethylene Bag Printed
M165	XZB45X63C05	Polyethylene Bag Camera
M168	YWT10X16C03	Polyethylene Bag for ATW Assy
M169	o YFV9CA0896BN	Packaging for WVP-F10E Series
	o YFV9CA0897BN	Packaging for WVP-F10N, WVP-F10NA
ELECTRONIC VIEWFINDER WV-VF01		
MISCELLANEOUS		
V101 ⚠	o M03JKF0WW	Cathode Ray Tube
L102 ⚠	o ELY10V301C	Coil Assy
CN10 ⚠	o S7-521N-601	CRT Socket Assy
CN11	o YFE0111J600	Power Cable Assy
M101	o YFV5GA0043A3	Cap
M102	o YFV5EA0385A3	Lens Cover
M103	o YFV5EA0386A3	Lens Holder
M104	o YFV4RA0017A4	Control Lever
M105	o YFV1VA0016A4	Lens
M106	o YFV5EA0374A2	CRT Upper Cover
M107	o YFV5EA0375A2	CRT Bottom Cover
M108	o YFV1UA0006A4	Mirror
M109	o YFV2FA0129A4	Cushion for CRT Cover
M110	o YFV4JA0068B4	Spring A for Earth
M111	o YFV4JA0132A4	Spring B for Lens Cover
M112	o YFV5EA0372A2	EVF Upper Cover
M113	o YFV5EA0373A2	EVF Bottom Cover
M114	o YFV4JA0049A4	Spring Plate A
M115	o YFV4JA0045A4	Coil Spring
M116	o YFV4RA0016A4	Lock Lever
M117	o YFV2WA0025A4	Frame
M118	o YFV2FA0014B4	Cushion for CRT

SYMBOL NO.	PART NO.	DESCRIPTION
M121 ⚠	o YFV7QA1089A4	Main Label for WV-VF01E
	o YFV7QA1090A4	Main Label for WV-VF01N
M123 ⚠	o YFV7MA0217A4	Service Man Caution Label
M124 ⚠	o YFV7MA0084A4	Hight Voltage Caution Label
M125	o NA-526PB7G	Badge for WV-VF01E
	o NA-527NB8G	Badge for WV-VF01N
M128 ⚠	o YFV7MA0218A4	Safety Label for WV-VF01E
M131	o YFV5EA0376A2	Handle Cover
M132	o YFV5RA0071A4	Lock Knob
M133	o YWCC704FM02	Spechial Screw for Shoe
M134	o YWCC704WM07	Spring Plate B for Shoe
M135	o YFV5MA0002B4	Shoe A
M136	o YFV2SA0252A4	Mounting Plate
M137	o YFV2CA0115A4	Blank Plate
M138	o YFV4JA0043B4	Coil Spring
M139	o YFV5MA0022A4	Shoe B
M140	o YFV6FA0058B3	Mounting Bracket
M141	o YFV4JA0134B4	Spring Plate C
M142	o YFV2CA0116A4	Push Plate
M143	o YFV2SA0253A4	Mounting Angle
M144	o YFV1FA0028A4	Nuts Plate
M145	o YFV4JA0133A4	Spring Plate D for Shoe
M147	o YFV5EA0370A4	ATW Sensor Cover A
M148	o YFV5EA0371A4	ATW Sensor Cover B
M149	o YFV3CA0069A4	Connector Holder
M150	o YFV6FA0056A4	Mounting Bracket
M151	o YFV1FA0026A4	Connector Holder

EVF BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB1	o YFVKBVF01E1A	Printed Circuit Board Assy
IC1 ⚠	NJM2048MC	IC
IC2	AN2510S	IC
Q1 ⚠	2SB837-CD	Transistor
Q2 ⚠	2SD1083	Transistor
Q3	2SB709A-QRTW	Transistor
D1	EK14	Diode
D2	MA151K	Diode
D3	EM1Z	Diode 140V 1A
D4	ES01F	Diode
R1	YF2116103JT	Carbon 10K ohms 1/16W
R2	YF2116821GT	Carbon 820 ohms 1/16W
R3	YF2116162JT	Carbon 1.6K ohms 1/16W
R4	YF2116102GT	Carbon 1K ohms 1/16W
R5	YF2116272GT	Carbon 2.7K ohms 1/16W
R6	YF2116363JT	Carbon 36K ohms 1/16W
R7	YF2116183JT	Carbon 18K ohms 1/16W
R8	YF21164R7JT	Carbon 4.7 ohms 1/16W
R9	YF2116512JT	Carbon 5.1K ohms 1/16W
R10	YF2116222GT	Carbon 2.2K ohms 1/16W
R11	YF2116623JT	Carbon 62K ohms 1/16W
R12	YF2116512JT	Carbon 5.1K ohms 1/16W
R13	YF2116561JT	Carbon 560 ohms 1/16W
R14	YF2116102GT	Carbon 1K ohms 1/16W
R15	YF2116222GT	Carbon 2.2K ohms 1/16W
R16,17	ERD25TJ185	Carbon 1.8M ohms 1/4W
R18	YF2116222GT	Carbon 2.2K ohms 1/16W
R19	YF2116101JT	Carbon 100 ohms 1/16W
R20	YF2116223JT	Carbon 22K ohms 1/16W
R21	YF2116224JT	Carbon 220K ohms 1/16W
R22	YF2116105JT	Carbon 1M ohms 1/16W
VR1	YFH0521A6R8K	Variable Resistor 6.8K ohms
VR2	YFH0521A100	Variable Resistor 100 ohms
VR3	YFH0521A4R7K	Variable Resistor 4.7K ohms
VR4	EVM45GA00BY6	Variable Resistor 3.3M ohms
VR5	YFH0521A4R7K	Variable Resistor 4.7K ohms
VR6	YFH0521A470K	Variable Resistor 470K ohms
C1	ECEA1EF330	Electrolytic 33 µF 25V
C2	ECEA1AF101	Electrolytic 100 µF 10V
C3	YF400102XKT	Ceramic 1000 pF
C4	YF400473FZT	Ceramic 0.047 µF
C5	ECEA1AKS470	Electrolytic 47 µF 10V
C6	YF426821CHJS	Ceramic 820 pF 50V
C7	ECEA1AU221	Electrolytic 220 µF 10V
C8	ECEA1AKS470	Electrolytic 47 µF 10V
C9	ECEA0JKS470	Electrolytic 47 µF 6.3V
C10	ECQV1H824JZ	Plastic 0.82 µF 50V
C11	ECQP1911JZ	Plastic 910 pF 100V
C12	YF400223XKT	Ceramic 0.022 µF
C13	ECEA0JKK100	Electrolytic 10 µF 6.3V
C14	ECQP1152JZ	Plastic 1500 pF 100V
C15	ECQV1H224JZ	Plastic 0.22 µF 50V
C16	ECEA1AKS470	Electrolytic 47 µF 10V
C17 ⚠	ECQP1272JZ	Plastic 2700 pF 100V
C18	ECEA1ASS101	Electrolytic 100µF 10V
C19	ECEA1AU221	Electrolytic 220 µF 10V
C20-22	DE979B152K	Ceramic 1500 pF 50V
C23	YF400221CHJT	Ceramic 220 pF
C24	ECEA2AU100	Electrolytic 10 µF 100V
C25	ECQV1H823JZ	Plastic 0.082 µF
L1	ELC08G010	Coil 100 µH
L2	YFELC10E010	Coil 470 µH
L3	ELC08G010	Coil 100 µH
L4	EL05SI8R2K	Coil 8.2 mH
L5	ELHSL306	Coil 450 µH
L6	EIR1QE028B	Coil 310 µF
T1 ⚠	HIPAKEVFF10	Flyback Transformer
F1 ⚠	YFSP510NM0	Current Fuse
CN1-JM	EMCS0650Z	6 pin Jack Male
CN2-JM	EMCS0450Z	4 pin Jack Male
M153	o YFV2HA0351A3	Shield Case
M154	o YFV2HA0352A4	Shield Cover

EVF VIC BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB2	o YFVKCVF01P1A	Printed Circuit Board Assy	
IC1	NJM3414M	IC	
Q1,2	2SD601-QR	Transistor	
Q3	2SC2404-CDTW	Transistor	
Q4	2SD601-QR	Transistor	
Q5,6	2SC2404-CDTW	Transistor	
Q7	2SD601-QR	Transistor	
Q8,9	2SA1022-C	Transistor	
R1	YF2116222GT	Carbon	2.2K ohms 1/16W
R2	YF2116163GT	Carbon	16K ohms 1/16W
R3	YF2116243GT	Carbon	24K ohms 1/16W
R4	YF2116623GT	Carbon	62K ohms 1/16W
R5	YF2116183GT	Carbon	18K ohms 1/16W
R6	YF2116750JT	Carbon	75 ohms 1/16W
R7,8	YF2116103JT	Carbon	10K ohms 1/16W
R9	YF2116392JT	Carbon	3.9K ohms 1/16W
R10	YF2116223JT	Carbon	22K ohms 1/16W
R11	YF2116103JT	Carbon	10K ohms 1/16W
R12	YF2116182JT	Carbon	1.8K ohms 1/16W
R13	YF2116152JT	Carbon	1.5K ohms 1/16W
R14	YF2116151JT	Carbon	150 ohms 1/16W
R15	YF2116332JT	Carbon	3.3K ohms 1/16W
R16	YF2116102GT	Carbon	1K ohms 1/16W
R17	YF2116332JT	Carbon	3.3K ohms 1/16W
R18	YF2116102GT	Carbon	1K ohms 1/16W
R19	YF2116152JT	Carbon	1.5K ohms 1/16W
R20,21	YF2116511JT	Carbon	510 ohms 1/16W
R22	YF2116512JT	Carbon	5.1K ohms 1/16W
R23	YF2116562JT	Carbon	5.6K ohms 1/16W
R24	YF2116183JT	Carbon	18K ohms 1/16W
R25,26	YF2116102GT	Carbon	1K ohms 1/16W
C1	ECEA0JKK100	Electrolytic	10 µF 6.3V
C2	ECEA1AKS470	Electrolytic	47 µF 10V
C3	ECEA1AKK100	Electrolytic	10 µF 10V
C4	ECEA0JKS470	Electrolytic	47 µF 6.3V
C5	ECEA0JKK100	Electrolytic	10 µF 6.3V
C6	ECEA1ASS101	Electrolytic	100µF 10V
C7	ECEA1AKS470	Electrolytic	47 µF 10V
C8	ECEA0JKS470	Electrolytic	47 µF 6.3V
C9	ECEA1AKS470	Electrolytic	47 µF 10V
C10	ECEA0JKS470	Electrolytic	47 µF 6.3V
C11,12	ECEA1AKK100	Electrolytic	10 µF 10V
C13	ECEA1AKS470	Electrolytic	47 µF 10V
C14	ECEA1ASS101	Electrolytic	100µF 10V
L1	ELC08G010	Coil	100 µH
L2	EL05SI8R2K	Coil	8.2µH
J1	ERD25TC0	Jumper Resistor	
CN1-JF	YF9059311012	10 pin Jack Female	

ATW CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB3	o VKZVF01P1A	Printed Circuit Board Assy
E102	o YFF10F7A	Flexible Jumper
CN1-JF	YF69346104	4 pin Jack Female
CN2-JF	YF68933208	8 pin Jack Female

ATW CONNECTOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB4	o YFVKZ3260P6A	Printed Circuit Board Assy
IC1	o YFTCB-S4	ATW Electric Ass'y
E101	o YFF10F6A	Flexible Jumper
CN1-JF	YF68933208	8 pin Jack Female

ACCESSORY PARTS/PACKAGING PARTS

SYMBOL NO.	PART NO.	DESCRIPTION
M161	o YFV8QA1054BN	Operating Instruction for WV-VF01E
	o YFV8QA1055BN	Operating Instruction for WV-VF01N
M162	YWT20X25C03	Polyethylene Bag for Printed
M163	YWT26X38C03	Polyethylene Bag for EVF
M165	o YFV9CA0851AN	Packaging
M166	YFV8FA0002A4	Packing Label for WV-VF01E
	YNL1E	Packing Label for WV-VF01N

GRIP SHOULDER WV-GR12E

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
M201	o YFV4AA0014A1	Left Side GripArm Cover
M202	o YFV4AA0015A1	Right Side Arm Cover
M203	o YFV5RA0030C4	Display Lock Knob
M204	o YFV5EA0384A4	Display Cover
M205	o YFV4JA0045A4	Spring B for Lock Knob
M206	o YFV5WA0278A4	Panel
M207	o YFV2VA0016A4	Barrier
M208	o YWCC702LR01	Cord Clamp
M209	o YFV5RA0010A4	Knob
M210	o YFV6JA0039B4	Key Board Button
M211	o YFV4JA0129A4	Spring F
M212	o YFV5RA0007A4	Knob
M213	o YFV2EA0043A4	Lever Guide B
M214	o YFV4JA0126A4	Spring E for Lock Lever
M215	o YFV6JA0012A4	Button
M216	o YFV4RA0015A4	Lock Lever
M217	o YFV1HA0022A4	Stopper Pin B
M218	o YFV2EA0042A4	Lever Guide A
M219	o YFV4JA0125A4	Spring D for Lever Guide
M220	o YFV7QA1105A4	Main Label
M221	o YFV2EA0044A3	Sholder Guide C
M222	o YFV6FA0057A4	Connector Bracket
M223	o YFV4JA0127A4	Spring Plate A

SYMBOL NO.	PART NO.	DESCRIPTION
M224	o YFV4JA0128A4	Spring Plate B
M225 (X2)	o YFV1EA0059B4	Special Screw for Sholder Guide
M226	o YFV5WA0277A4	Blank Panel
M227	o YWV3030FM01	Special Screw for Connector Bracket
M228	o YFV5VA0042A2	Sholder Base
M229	o YFV5VA0044C4	Sholder Pad
M231	o YFV5JA0011A2	Right Side Grip
M232	o YFV5JA0012A2	Left Side Grip
M233	o YFV2TA0027B3	Mounting Bracket for Housing
M235	o YFV2FA0051A4	Cushion B for Grip
M236	o YFV4JA0124A4	Spring C for Grip
M237	o YFV6JA0038A3	Zoom Button
M238	o YFV2FA0013B4	Switch Ruber Cushio
M239	o YFV6JB0013A4	REC Button
M240	o YFV5YA0024A3	Grip Band
M241	o YFV2TA0028B4	Mounting Bracket Grip Band
M244	o YFV1FA0027A4	Nut
M245	o YFV4EA0008A4	Gear
M246	o YFV4JA0008A4	Spring A

SWITCH BOARD

PCB1	o YFVKYGR12P1A	Printed Circuit Board Assy
D1-8	MA165	Diode
L1	EL05SI150K	Coil
SW1	YFSSS322	Slide Switch
SW2-7	YFEVQQVU04W	Push Switch
CN1-JF	YF559712APB	12 Pin Jack Female
CN2-JM	EMCS0650ZL	6 Pin Jack Male

REC/PAUSE SWITCH BOARD

PCB2	YWV3100ZR07	Printed Circuit Board Assy
SW1	KEC10902	Push Switch

ZOOM SWITCH BOARD

PCB3	o YFVKZGR12P1A	Printed Circuit Board Assy
SW2-5	KEG10902	Push Switch
M243	YFV3CA0070A3	Zoom Button Holder

14 PIN CONNECTOR BOARD

PCB4	o YFVKZ3260P4A	Printed Circuit Board Assy
CN201	YFXC5E1481	14 Pin Connector
E201	o YFF10F8A	Flexible Jumper

SYMBOL NO.	PART NO.	DESCRIPTION

ACCESSORY PARTS/PACKAGING PARTS

M251	o YFV8QA1056AN	Operating Instruction
M252	YWT20X25C03	Polyethylene Bag for Printed
M253	YWT26X60C03	Polyethylene Bag for Grip
Shoulder		
M255	o YFV9CA0857BN	Packaging Ass'y
M256	YFV8FA0002A4	Packing Label

CHEEK PAD WV-Q43

MISCELLANEOUS

M1	o YFV5EA0378A2	Cover
M2	o YFV5EA0388A4	Cover
M3	o YFV2SA0255A4	Mounting Angle
M4	o YFV2TA0031A4	Mounting Bracket
M5	o YFV4JA0136A4	Spring
M6	o YFV5VA0043A3	Pad
M7	o YFV1EA0061A4	Special Screw
M8	o YFV7QA1106A4	Main Label

ACCESSORY PARTS/PACKAGING PARTS

M11	o YFV8QA1081AN	Operating Instruction
M12	YWT20X25C03	Polyethylene Bag for Printed
M13	YWT15X20C03	Polyethylene Bag for Cheek Pad
M15	o YFV9CA0859AN	Packaging
M16	YFV8FA0078AN	Packing Label

AUTOFOCUS LENS UNIT WV-LZ14/8AFE

M151	o YFV5EA0289A3	Autofocus Cover A
M152	o YFV5EA0290A3	Autofocus Cover B
M155	o YF511701	Lens Cover A
M156	o YF511702	Lens Cover B
M157	YF511329	Mounting Plate
M158	o YF511706	Lens Assy
M160	YF509242	Lens Hood Cap
M161	YF509241	Lens Hood
M162	YF509237	Focus Band
M163	YF509075	Zoom Lever
M164	YF511330	Focus Gear Assy
M165	YF511315	Holder Assy
M166	YF511342	Focus Motor
M167	YF511343	Zoom Motor
M168	o YF511705	AIC Assy
M170	YF511707	Switch Cover
M171	YF509054	Slide Switch
M172	YF509056	Push Button
M173	YF511356	Switch Board
M174	YF510919	Manual Shaft Assy
M175	YF511340	Focus Sensor
M176	YF511341	Zoom Sensor
M178	o YFV7QA1112A4	Main Label

AUTOFOCUS BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB20	o YFVKY0F10E2A	Printed Circuit Board Assy	
IC1	M51265FP	IC	
IC2	M51090FP	IC	
IC3	MN1554CVR	IC	
IC4,5	NJU4053BM	IC	
IC6	M5233FP	IC	
IC7	NJM3414M	IC	
IC8	M5234FP	IC	
IC9	NJM3414M	IC	
IC10	M51951AMLW	IC	
Q1	2SB709-Q	Transistor	
Q2	2SD601-QR	Transistor	
Q3	2SB709-Q	Transistor	
Q4	2SD601-QR	Transistor	
Q5	2SB709-Q	Transistor	
Q6-8	2SD601-QR	Transistor	
Q9-11	2SB709-Q	Transistor	
Q12	2SC3138TPR	Transistor	
Q13	2SA1255TPR	Transistor	
Q14,15	2SD601-QR	Transistor	
D1,2	MA151K	Diode	
D3	MA153	Diode	
D4	MA158TW	Diode	
D5	MA151K	Diode	
D6	1SS250TPR	Diode	
R1-11	YF2116102GT	Carbon	1K ohms 1/16W
R12	YF2116203JT	Carbon	20K ohms 1/16W
R13	YF2116752JT	Carbon	7.5K ohms 1/16W
R14	YF2116204JT	Carbon	200K ohms 1/16W
R15	YF2116335JT	Carbon	3.3M ohms 1/16W
R16	YF2116472JT	Carbon	4.7K ohms 1/16W
R17	YF2116333GT	Carbon	33K ohms 1/16W
R18	YF2116105JT	Carbon	1M ohms 1/16W
R19	YF2116304JT	Carbon	300K ohms 1/16W
R20	YF2116272JT	Carbon	2.7K ohms 1/16W
R21,22	YF2116103JT	Carbon	10K ohms 1/16W
R23	YF2116224JT	Carbon	220K ohms 1/16W
R24	YF2116824JT	Carbon	820K ohms 1/16W
R25	YF2116222GT	Carbon	2.2K ohms 1/16W
R26,27	YF2116512JT	Carbon	5.1K ohms 1/16W
R28	YF2116473GT	Carbon	47K ohms 1/16W
R29	YF2116133JT	Carbon	13K ohms 1/16W
R30	YF2116224JT	Carbon	220K ohms 1/16W
R31	YF2116824JT	Carbon	820K ohms 1/16W
R32	YF2116103JT	Carbon	10K ohms 1/16W
R33	YF21164R7JT	Carbon	4.7 ohms 1/16W
R34	ER0S2CKF6801	Metal	6.8K ohms 1/8W
R35	YF2116273JT	Carbon	27K ohms 1/16W
R36	YF2116182JT	Carbon	1.8K ohms 1/16W
R37	YF2116272JT	Carbon	2.7K ohms 1/16W
R38	YF2116822JT	Carbon	8.2K ohms 1/16W
R39	YF2116224JT	Carbon	220K ohms 1/16W
R40	YF2116392JT	Carbon	3.9K ohms 1/16W
R41	YF2116203JT	Carbon	20K ohms 1/16W
R42	YF2116134GT	Carbon	130K ohms1/16W
R43	YF2116822JT	Carbon	8.2K ohms 1/16W
R44	YF2116155GT	Carbon	1.5M ohms 1/16W
R45	YF2116514GT	Carbon	510K ohms 1/16W
R46	YF2116433GT	Carbon	43K ohms 1/16W
R47	YF2116124GT	Carbon	120K ohms 1/16W
R48	YF2116104JT	Carbon	100K ohms 1/16W
R49	YF2116244JT	Carbon	240K ohms 1/8W
R50	YF2116185JT	Carbon	1.8M ohms 1/16W
R51	YF21164R7JT	Carbon	4.7 ohms 1/16W
R52-54	YF2116104JT	Carbon	100K ohms 1/16W
R55	YF2116432JT	Carbon	4.3K ohms 1/16W
R56	YF2116182JT	Carbon	1.8K ohms 1/16W
R57	YF2116242JT	Carbon	2.4K ohms 1/16W
R58	YF2116104JT	Carbon	100K ohms 1/16W
R59	LP1610KJT3	Carbon	10K ohms
R60	YF2116103JT	Carbon	10K ohms 1/16W
R61	YF2116104JT	Carbon	100K ohms 1/16W
R62	YF2116334JT	Carbon	330K ohms 1/16W
R63	YF2116332JT	Carbon	3.3K ohms 1/16W
R64,65	YF2116105JT	Carbon	1M ohms 1/16W
R66	YF2116334JT	Carbon	330K ohms 1/16W
R67	YF2116103JT	Carbon	10K ohms 1/16W
R68	YF2116104JT	Carbon	100K ohms 1/16W
R69	YF2116823JT	Carbon	82K ohms 1/16W
R70	YF2116204JT	Carbon	200K ohms 1/16W
R71	YF2116394JT	Carbon	390K ohms 1/16W
R72	YF2116204JT	Carbon	200K ohms 1/16W
R73,74	YF2116104JT	Carbon	100K ohms 1/16W
R75	YF2116204JT	Carbon	200K ohms 1/16W
R76	YF2116394JT	Carbon	390K ohms 1/16W
R77	YF2116125JT	Carbon	1.2M ohms 1/16W
R78	YF2116624JT	Carbon	620K ohms 1/16W
R79	YF2116334JT	Carbon	330K ohms 1/16W
R80	YF2116164JT	Carbon	160K ohms 1/16W
R81	YF2116514JT	Carbon	510K ohms 1/16W
R82	YF2116394JT	Carbon	390K ohms 1/16W
R83	YF2116104JT	Carbon	100K ohms 1/16W
R84	YF2116472JT	Carbon	4.7K ohms 1/16W
R85	YF2116154JT	Carbon	150K ohms 1/16W
R86	YF2116134GT	Carbon	130K ohms 1/16W
R87	YF2116203GT	Carbon	20K ohms 1/16W
R88	YF2116105JT	Carbon	1M ohms 1/16W
R89	YF2116105GT	Carbon	1M ohms 1/16W
R90	YF211610[illegible]T	Carbon	10K ohms 1/16W
R91	YF2116105JT	Carbon	1M ohms 1/16W
R92,93	YF2116333GT	Carbon	33K ohms 1/16W
R94	YF2116814JT	Carbon	910K ohms 1/16W
R95	YF2116203JT	Carbon	20K ohms 1/16W
R96	YF2116223GT	Carbon	22K ohms 1/16W
R97	YF2116273GT	Carbon	27K ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION
R98	YF2116224JT	Carbon 220K ohms 1/16W
R99	YF2116822JT	Carbon 8.2K ohms 1/16W
R100	YF2116104JT	Carbon 100K ohms 1/16W
R101	YF2116753JT	Carbon 75K ohms 1/16W
R102,103	YF2116223JT	Carbon 22K ohms 1/16W
R104	YF2116753JT	Carbon 75K ohms 1/16W
R105,106	YF2116224JT	Carbon 220K ohms 1/16W
R107,108	YF2116104JT	Carbon 100K ohms 1/16W
R109	YF2116473GT	Carbon 47K ohms 1/16W
R110	YF2116823JT	Carbon 82K ohms 1/16W
R111,112	YF2116224JT	Carbon 220K ohms 1/16W
R113	YF2116104JT	Carbon 100K ohms 1/16W
R114	YF2116105JT	Carbon 1M ohms 1/16W
R115	YF2116333GT	Carbon 33K ohms 1/16W
R116	YF2116103GT	Carbon 10K ohms 1/16W
R117	YF2116182GT	Carbon 18K ohms 1/16W
R118	YF2116102GT	Carbon 1K ohms 1/16W
R119	YF2116474JT	Carbon 470K ohms 1/16W
VR1	EVM13SX00B16	Variable Resistor 1M ohms
VR2	EVM13SX00BS3	Variable Resistor 68K ohms
VR3	EVM13SX00B16	Variable Resistor 1M ohms
VR4	EVM13SW00B54	Variable Resistor 50K ohms
VR5	EVM13SW00BS3	Variable Resistor 6.8K ohms
VR6	EVM13SW00B15	Variable Resistor 100K ohms
VR7	EVM13SW00BS3	Variable Resistor 6.8K ohms
VR8	EVM13SX00B24	Variable Resistor 22K ohms
VR9	EVM13SX00B16	Variable Resistor 1M ohms
C1	YF400221CHJT	Ceramic 220 pF
C2,3	YF400102FZT	Ceramic 1000 pF
C4	ECEA0JKS470	Electrolytic 47 µF 6.3V
C5	YF400223FZT	Ceramic 0.022 µF
C6	YF400473FZT	Ceramic 0.047 µF
C7	ECEA1AKK100	Electrolytic 10 µF 10V
C8-11	YF400473FZT	Ceramic 0.047 µF
C12	ECEA0JKS220	Electrolytic 22 µF 6.3V
C13	YF400183FZT	Ceramic 0.018 µF
C14	YF400473FZT	Ceramic 0.047 µF
C15	ECEA1HKK010	Electrolytic 1 µF 50V
C16	YF400473FZT	Ceramic 0.047 µF
C17	YF400183FZT	Ceramic 0.018 µF
C18	YF400223FZT	Ceramic 0.022 µF
C19	YF400102FZT	Ceramic 1000 pF
C20	YF400104FZT	Ceramic 0.1 µF
C21	YF400183FZT	Ceramic 0.018 µF
C22	ECEA0JKS220	Electrolytic 22 µF 6.3V
C23-26	YF400473FZT	Ceramic 0.047 µF
C27	ECEA0JKS220	Electrolytic 22 µF 6.3V
C28	YF400104FZT	Ceramic 0.1 µF
C29-33	YF400473FZT	Ceramic 0.047 µF
C34	YF400183FZT	Ceramic 0.018 µF
C35,36	ECEA0JKS101	Electrolytic 100µF 6.3V
C37	ECQV1H394JZ	Plastic 0.39 µF 50V
C38	YF400153XKT	Ceramic 0..015 µF
C39	ECQV1H394JZ	Plastic 0.39 µF 50V
C40,41	YF400104FZT	Ceramic 0.1 µF

SYMBOL NO.	PART NO.	DESCRIPTION
C42	ECQM1H102JZ	Plastic 1000 pF
C43	YF400151CHJT	Ceramic 150 pF
C44	YF400331SLKT	Ceramic 330 pF
C45-48	YF426104XJS	Ceramic 0.1 µF
C49	YF400223XKT	Ceramic 0.022 µF
C50	YF400153XKT	Ceramic 0.015 µF
C51	YF400104FZT	Ceramic 0.1 µF
C52	YF400331SLKT	Ceramic 330 pF
C53	ECEA1AU221	Electrolytic 220 µF 10V
C54	ECEA1CKS100	Electrolytic 10 µF 16V
C55,56	YF400473FZT	Ceramic 0.047 µF
C57	ECEA1CKS100	Electrolytic 10 µF 16V
C58,59	YF400333FZT	Ceramic 0.033 µF
C60	YF400103FZT	Ceramic 0.01 µF
C61	ECEA1AKS470	Electrolytic 47 µF 10V
C62,63	YF400330CHJT	Ceramic 33 pF
C64	ECEA0JKS470	Electrolytic 47 µF 6.3V
C65	ECEA0JKS220	Electrolytic 22 µF 6.3V
C66,67	YF426104XJS	Ceramic 0.1 µF
C68	YF400222XKT	Ceramic 2200 pF
C69	YF400102FZT	Ceramic 1000 pF
C70	YF400104FZT	Ceramic 0.1 µF
C71	YF400103FZT	Ceramic 0.01 µF
C72	YF400221CHJT	Ceramic 220 pF
C75	ECCF1H680JC	Ceramic 68 pF 50V
L1	NL45T330K	Coil 33 µH
L2	YFEL07SI681K	Coil 680 µH
L3	NL45T330K	Coil 33 µH
T1	ETE13K15AZ	Flyback Transformer
X1	YFCSA4R0MGB	Crystal Oscillator
CF1	ELB4T011	Filter
CF2	ELB4T010	Filter
CF3	YFSLP4100	Filter
J1,3	YF21160R00T	Jumper
J4-11	YF21160R00T	Jumper
CN1-JM	EMCS0550Z	5 pin Jack Male
CN2-JM	EMCS1050Z	10 pin Jack Male
CN3-JM	EMCS0350Z	3 pin Jack Male
CN4,5-JM	EMCS0250Z	2 pin Jack Male
CN6-JM	EMCS0650Z	6 pin Jack Male
CN7-JM	EMCS0750Z	7 pin Jack Male
M85	o YFV2HA0420A4	Shield Parts

ACCESSORY PARTS/PACKAGING PARTS

M181	o YFV8QA1057AN	Operating Instruction
M182	YWT20X25C03	Polyethylene Bag
M185	o YFV9CA0860AN	Packaging
M186	YFV8FA0002A4	Packing Label

SYMBOL NO.	PART NO.	DESCRIPTION

POWER ZOOM LENS WV-LZ14/12E

SYMBOL NO.	PART NO.	DESCRIPTION
CN1	YF511418	20 Pin Connector Cable Assy
M1	o YF401447	Lens Hood Cap
M2	o YF401611	Lens Hood
M3	o YF401608	Focus Band
M4	o YF511604	A Focal Assy
M5	o YF511602	Lens Cover B
M6	YF511419	AIC Assy
M7	YF511410	Mastor Lens Assy
M8	YF503004	Lens Mount
M9	YF511420	Zoom Motor
M10	YF510907	Manual Knob Assy
M11	o YF511601	Lens Cover A
M12	o YF616129	Zoom Lever
M13	o YF616139	Zoom Button
M14	o YF121688	Zoom Button Spring
M15	o YFV7QA1123A4	Main Label

ACCESSORY PARTS/PACKAGING PARTS

SYMBOL NO.	PART NO.	DESCRIPTION
M181	o YFV8QA1041AN	Operating Instruction
M182	YWT20X25C03	Polyethylene Bag
M185	o YFV9CA0849AN	Packaging Ass'y
M186	YFV8FA0004A3	Packaging Label

STEREO MICROPHONE WV-MC12

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
MIC1	o YFM0MA0032AN	Mic Unit
CN1	o YFMLKA0267A4	Mic Cable Assy
M1	o YFM6CC0020A4	Wind Screen Assy
M2	o YFM5KA0180A3	Mic Head Cover
M3	o YFM7AA0062A4	Mic Unit Shield Cover
M4	o YFM5KA0592A2	Mic Case A
M5	o YFM5KA0593A4	Mic Case B
M6	o YFM2LA0057A4	Joint

ACCESSORY PARTS/PACKAGING PARTS

SYMBOL NO.	PART NO.	DESCRIPTION
M11	o YFV8QA1079AN	Operating Instruction
M12	YPM-PN594AA4	Polyethylene Bag
M13	o YPM-PN966AA4	Packaging

CAMERA CABLE WV-CA10

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
CN1	o EMCU10B4T43V	Camera Cable Assy

GEN-LOCK ADAPTOR WV-AD36

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
Q21	2SC1398-QR	Transistor
SW1	YFSSB022L6NR	Power Switch
CN1,2	YFBNC-BRZ-1	BNC Connector
CN4	YGRM15TRD10S	10Pin SEG Connector
CN5	YFXLR432F512	4Pin External Connector
M1	o YFV5EA0379A1	Cover
M2	o YFV5WA0281A4	Right Side Panel
M3	o YFV5WA0282A4	Panel-1
M4	o YFV5WA0283A4	Panel-2
M5 ⚠	o YFV7QA1099A4	Main Label for WV-AD36E
⚠	o YFV7QA1100A4	Main Label for WV-AD36N
M6 ⚠	o YFV7MA0099A4	Caution Label
M7 ⚠	o YFV7SA0169A4	Switch Label
M8 ⚠	o YFV7MA0219A4	Fuse Label
M11	o YFV2KA0145A3	Chassis
M12	o YFV2SA0251A4	Mounting Angle
M15	o YFV5EA0383A2	Mounting Base
M16	o YFV6JA0012A4	Button
M17	o YFV2CA0114A4	Hold Plate
M18	o YFV6GA0049A4	Plate
M19	o YFV6GA0050A4	Plate
M20	o YFV4RA0009A4	Lever
M21	o YFV4JA0084A4	Spring-A
M22	o YFV4JA0130A4	Spring Plate
M23	o YFV4JA0131A4	Spring-B
M24	o YFV5VA0045A4	Pad
M25	o YFV2EA0045A4	Mounting Guide
M26	o YFV5EA0406A4	Stopper Pin
M27	o YFV2EA0046A4	Mounting Plate

MAIN BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB1-1	o YFVKBAD36E1A	Printed Circuit Board Assy
IC3	MN4053BS	IC
IC4	M5234FP	IC
IC5	NJM3414M	IC
Q1	2SC2404-CDTW	Transistor
Q2-4	2SD601-QR	Transistor
Q5	2SC2404-CDTW	Transistor
Q6	2SB709-Q	Transistor
Q7-9	2SC2404-CDTW	Transistor
Q18	2SB709-Q	Transistor
Q19	2SD601-QR	Transistor

SYMBOL NO.	PART NO.	DESCRIPTION	
Q20	2SB709-Q	Transistor	
R1	YF2116153JT	Carbon	15K ohms 1/16W
R2	YF2116562JT	Carbon	5.6K ohms 1/16W
R3	YF2116222GT	Carbon	2.2K ohms 1/16W
R4	YF2116102GT	Carbon	1K ohms 1/16W
R5	YF2116332JT	Carbon	3.3K ohms 1/16W
R6,7	YF2116272JT	Carbon	2.7K ohms 1/16W
R8	-2116105JT	Carbon	1M ohms 1/16W
R9	YF2116102GT	Carbon	1K ohms 1/16W
R10	YF2116223JT	Carbon	22K ohms 1/16W
R11	YF2116332JT	Carbon	3.3K ohms 1/16W
R12	YF2116103JT	Carbon	10K ohms 1/16W
R13,14	YF2116222GT	Carbon	2.2K ohms 1/16W
R15,16	YF2116102GT	Carbon	1K ohms 1/16W
R17	YF2116101JT	Carbon	100 ohms 1/16W
R18	YF2116103JT	Carbon	10K ohms 1/16W
R19,20	YF2116102GT	Carbon	1K ohms 1/16W
R21	YF2116103JT	Carbon	10K ohms 1/16W
R53	YF2116203JT	Carbon	20K ohms 1/16W
R54,55	YF2116103JT	Carbon	10K ohms 1/16W
R56	YF2116203JT	Carbon	20K ohms 1/16W
R57	YF2116222GT	Carbon	2.2K ohms 1/16W
R58	YF2116103JT	Carbon	10K ohms 1/16W
R59	YF2116562JT	Carbon	5.6K ohms 1/16W
R60	YF2116302JT	Carbon	3K ohms 1/16W
R61	YF2116332JT	Carbon	3.3K ohms 1/16W
R62	YF2116562JT	Carbon	5.6K ohms 1/16W
R63	YF2116392JT	Carbon	3.9K ohms 1/16W
R64	YF2116102GT	Carbon	1K ohms 1/16W
R65	YF2116183JT	Carbon	18K ohms 1/16W
R66	YF2116562JT	Carbon	5.6K ohms 1/16W
R67	YF2116432JT	Carbon	4.3K ohms 1/16W
R68,69	YF2116682JT	Carbon	6.8K ohms 1/16W
R70,71	YF2116103JT	Carbon	10K ohms 1/16W
R72	YF2116622JT	Carbon	6.2K ohms 1/16W
R73,74	YF2116822JT	Carbon	8.2K ohms 1/16W
R75	YF2116332JT	Carbon	3.3K ohms 1/16W
R76	YF2116102GT	Carbon	1K ohms 1/16W
R77	YF2116103JT	Carbon	10K ohms 1/16W
R78	YF2116223JT	Carbon	22K ohms 1/16W
R79	YF2116681JT	Carbon	680 ohms 1/16W
R80,81	YF2116103JT	Carbon	10K ohms 1/16W
R82	YF2116102GT	Carbon	1K ohms 1/16W
R83	YF2116202JT	Carbon	2K ohms 1/16W
R84	YF2116750JT	Carbon	75 ohms 1/16W
R85	YF2116682JT	Carbon	6.8K ohms 1/16W
R86	YF2116103JT	Carbon	10K ohms 1/16W
R89	YF2116750JT	Carbon	75 ohms 1/16W
R90	YF2116104JT	Carbon	100K ohms 1/16W
R98	YF2116100JT	Carbon	10 ohms 1/16W
R100	YF2116123JT	Carbon	12K ohms 1/16W
VR1	YF6M2L10KB	Variable Resistor	10K ohms
VR2	YF6M2L1KB	Variable Resistor	1K ohms
C1	ECEA0JKS470	Electrolytic	47 µF 6.3V
C2	YF400390CHJT	Ceramic	39 pF

SYMBOL NO.	PART NO.	DESCRIPTION	
C3	YF426224FZS	Ceramic	0.22 µF 50V
C4	YF400101CHJT	Ceramic	100 pF
C5	YF400680CHJT	Ceramic	68 pF CH
C6	YF400101CHJT	Ceramic	100 pF
C7,8	YF400103FZT	Ceramic	0.01 µF
C21	ECEA1AKS470	Electrolytic	47 µF 10V
C23	ECEA0JKS470	Electrolytic	47 µF 6.3V
C24,25	ECEA1CKS100	Electrolytic	10 µF 16V
C26	ECEA1AKS470	Electrolytic	47 µF 10V
C27	ECEA0JKS101	Electrolytic	100µF 6.3V
C28	ECEA1AKS470	Electrolytic	47 µF 10V
C30	ECEA0JKS470	Electrolytic	47 µF 6.3V
L1,2	NL32T8R2K	Coil	8.2µH
SW1,2	YFSSS212YK	Slide Switch	
CF1	YFSTR4044	Filter	
CF4	YFT45P4R43	Filter	
F1	YFSP510NM0	Current Fuse	
J1,221	YF21160R00T	Jumper Resistor	
CN1-JM	EMCS0650Z	6 pin Jack Male	
CN2-JM	EMCS0950Z	9 pin Jack Male	
CN4-JM	EMCS0650Z	6 pin Jack Male	
CN5-JM	EMCS0350Z	3 pin Jack Male	
CN6-8-JM	EMCS0250Z	2 pin Jack Male	
CN9,10-JF	YFFPC11SS1T1	11 pin Jack Female	
CN11-JM	EMCS0450Z	4 pin Jack Male	
CN12-JM	EMCS0550Z	5 pin Jack Male	

MAIN VIC BOARD

PCB1-2	o YFVKCAD36E1A		
IC1	YFNJM1496M	IC	
IC2	MN74HC221S	IC	
Q10,11	2SC2404-CDTW	Transistor	
Q12	2SA1022-CD	Transistor	
Q14-17	2SC2404-CDTW	Transistor	
Q23	2SC2404-CDTW	Transistor	
R22	YF2116272JT	Carbon	2.7K ohms 1/16W
R23	YF2116123JT	Carbon	12K ohms 1/16W
R24	YF2116102GT	Carbon	1K ohms 1/16W
R25	YF2116112JT	Carbon	1.1K ohms 1/16W
R26	YF2116102GT	Carbon	1K ohms 1/16W
R27	YF2116222GT	Carbon	2.2K ohms 1/16W
R29,30	YF2116243GT	Carbon	24K ohms 1/16W
R31	YF2116682JT	Carbon	6.8K ohms 1/16W
R32	YF2116332GT	Carbon	3.3K ohms 1/16W
R35,36	YF2116202JT	Carbon	2K ohms 1/16W
R37	YF2116272JT	Carbon	2.7K ohms 1/16W
R38	YF2116152JT	Carbon	1.5K ohms 1/16W
R39,40	YF2116331JT	Carbon	330 ohms 1/16W
R41	YF2116821GT	Carbon	820 ohms 1/16W
R42	YF2116432JT	Carbon	4.3K ohms 1/16W
R43	YF2116272JT	Carbon	2.7K ohms 1/16W
R44	YF2116162JT	Carbon	1.6K ohms 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION
R45	YF2116221JT	Carbon 220 ohms 1/16W
R46	YF2116103JT	Carbon 10K ohms 1/16W
R47	YF2116332JT	Carbon 3.3K ohms 1/16W
R48	YF2116102GT	Carbon 1K ohms 1/16W
R49	YF2116103JT	Carbon 10K ohms 1/16W
R50	YF2116152JT	Carbon 1.5K ohms 1/16W
R51	ER0S2CKF5601	Metal 5.6K ohms 1/8W
R52	YF2116222GT	Carbon 2.2K ohms 1/16W
R92	YF2116103JT	Carbon 10K ohms 1/16W
R93	YF2116104JT	Carbon 100K ohms 1/16W
R94,95	YF2116102GT	Carbon 1K ohms 1/16W
R96	LP161KGT57	Carbon 1K ohms
R227	ERD10TJ821	Carbon 820 ohms 1/8W
R235	ERD10TJ101	Carbon 100 ohms 1/8W
R236	ERD10TJ103	Carbon 10K ohms 1/8W
C9	YF400103FZT	Ceramic 0.01 µF
C10	YF400270CHJT	Ceramic 27 pF
C11	ECEA0JKS470	Electrolytic 47 µF 6.3V
C12	ECEA1CKS100	Electrolytic 10 µF 16V
C13-15	YF400103FZT	Ceramic 0.01 µF
C16	YF400104FZT	Ceramic 0.1 µF
C17	ECEA0JKS470	Electrolytic 47 µF 6.3V
C18	YF400103FZT	Ceramic 0.01 µF
C19	ECEA0JKS470	Electrolytic 47 µF 6.3V
C20	YF400120CHJT	Ceramic 12pF
C29	ECEA0JKS470	Electrolytic 47 µF 6.3V
C31	YF400101CHJT	Ceramic 100 pF
C32,35	YF400104FZT	Ceramic 0.1 µF
CF2	YFSTR4046	Filter
CF3	YFSTR4044	Filter

LED BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB2	o YFVKZAD36P1A	Printed Circuit Board Assy
D1	LN28RP	LED
D2	LN48YP	LED

32 PIN CONNECTOR BOARD

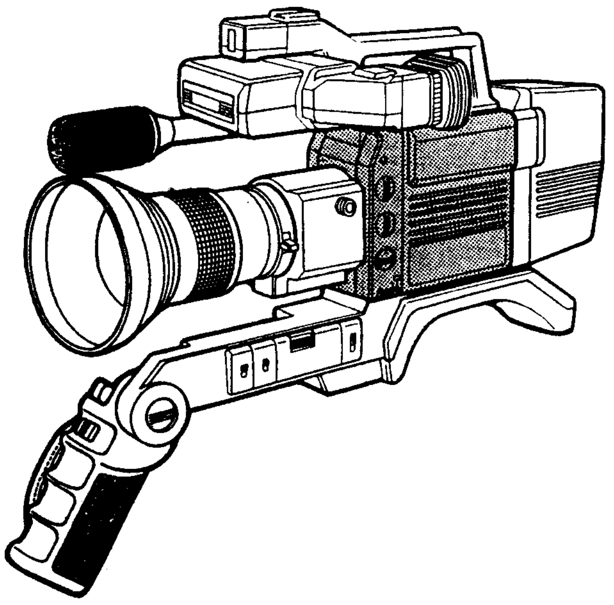
SYMBOL NO.	PART NO.	DESCRIPTION
PCB3	o YFVKZAD36P2A	Printed Circuit BoardAssy
CN1	YFA348949324	32 pin Connector
CN2-JM	EMCS0250Z	2 pin Jack Male

ACCESSORY PARTS/PACKAGING PARTS

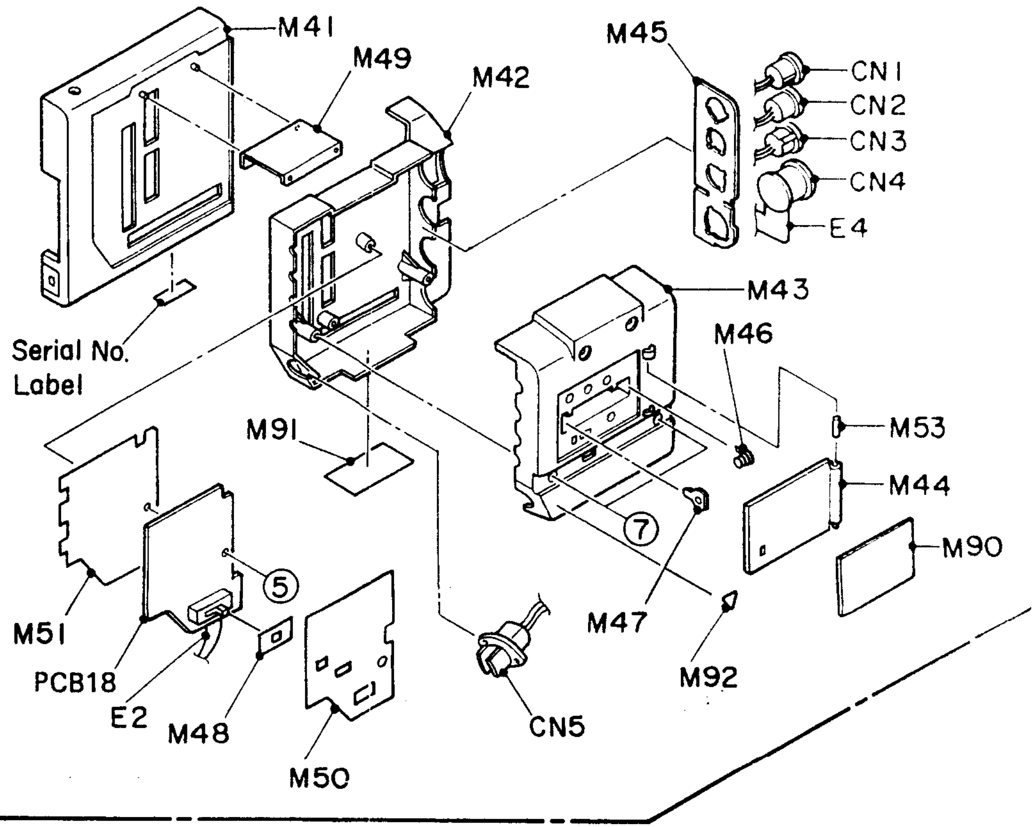
SYMBOL NO.	PART NO.	DESCRIPTION
M32	o YFV8QA1085AN	Operating Instruction for WV-AD36E
	o YFV8QA1086AN	Operating Instruction for WV-AD36N
M36	YWT20X25C03	Polyethylene Bag
M40	o YFV9CA0881AN	Packaging Ass'y

SYMBOL NO.	PART NO.	DESCRIPTION

EXPLODED VIEW

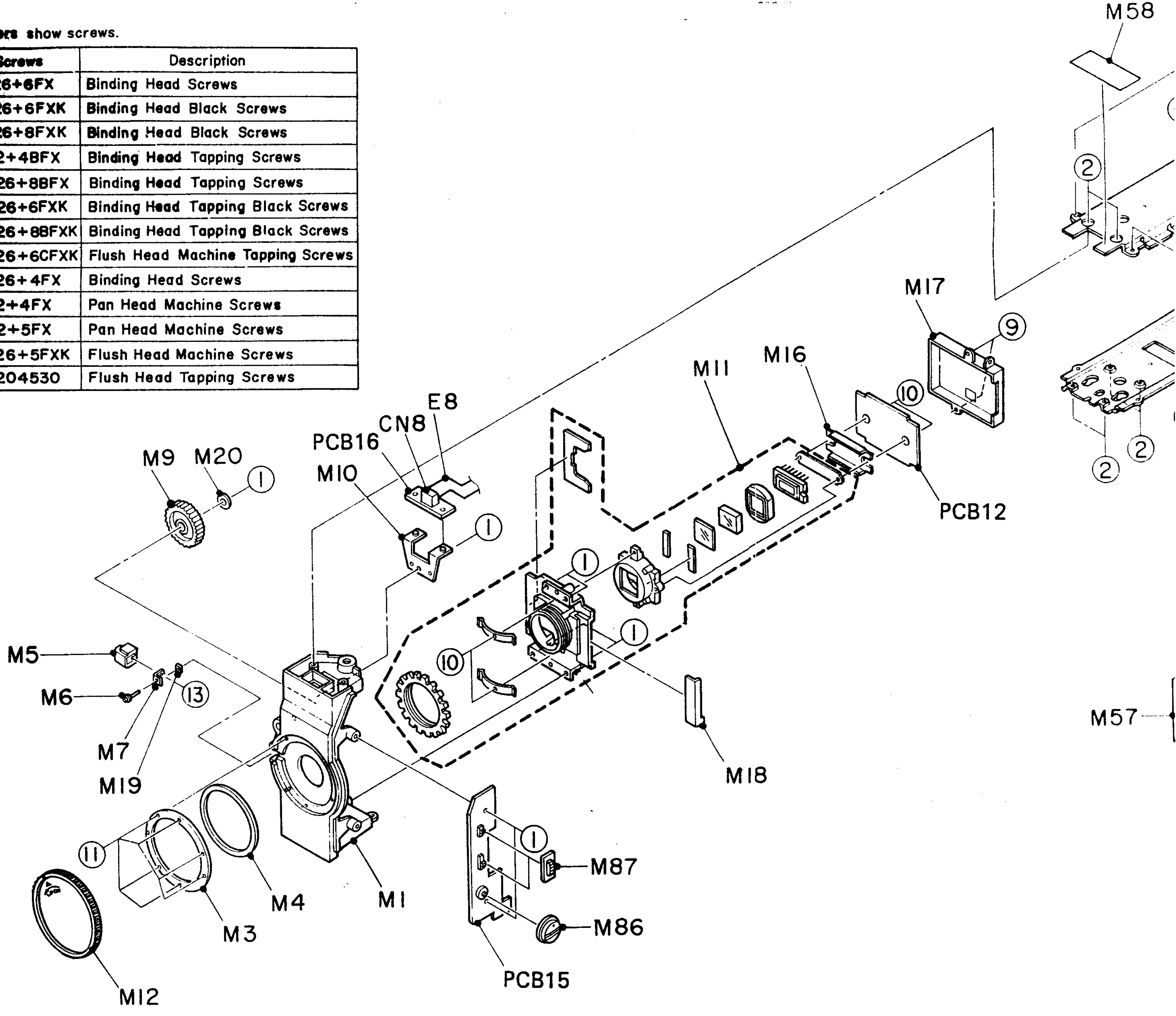


PCB6	YFVKB3260P3A
CN1	YFD0121N600
CN2	YFD0111N609
CN3	YFD5110N601
CN4	YFDJ210N200
CN5	EMCTMA06C03V
E2	YFF10F2A
E4	YFF10F3A
M41	YFV5EA0365A1 YFV5EB0365A1
M42	YFV5EA0366A1
M43	YFV5EA0367B2
M44	YFV5EA0368A3
M45	YFV2SA0249A4
M46	YFV4JA0122A4
M47	YFV4JA0123A4
M48	YFV5WA0299A4
M49	YFV2SA0243A4
M50	YFV2HA0424A4
M51	YFV2PA0166A4
M53	YFXPL2A10WV
M90	YFV7PA0036A4 YFV7PA0038A4
M91	YFV7QA1074A4 YFV7QA1104A4 YFV7QA1127A4
M92	YFV7MA0103A4

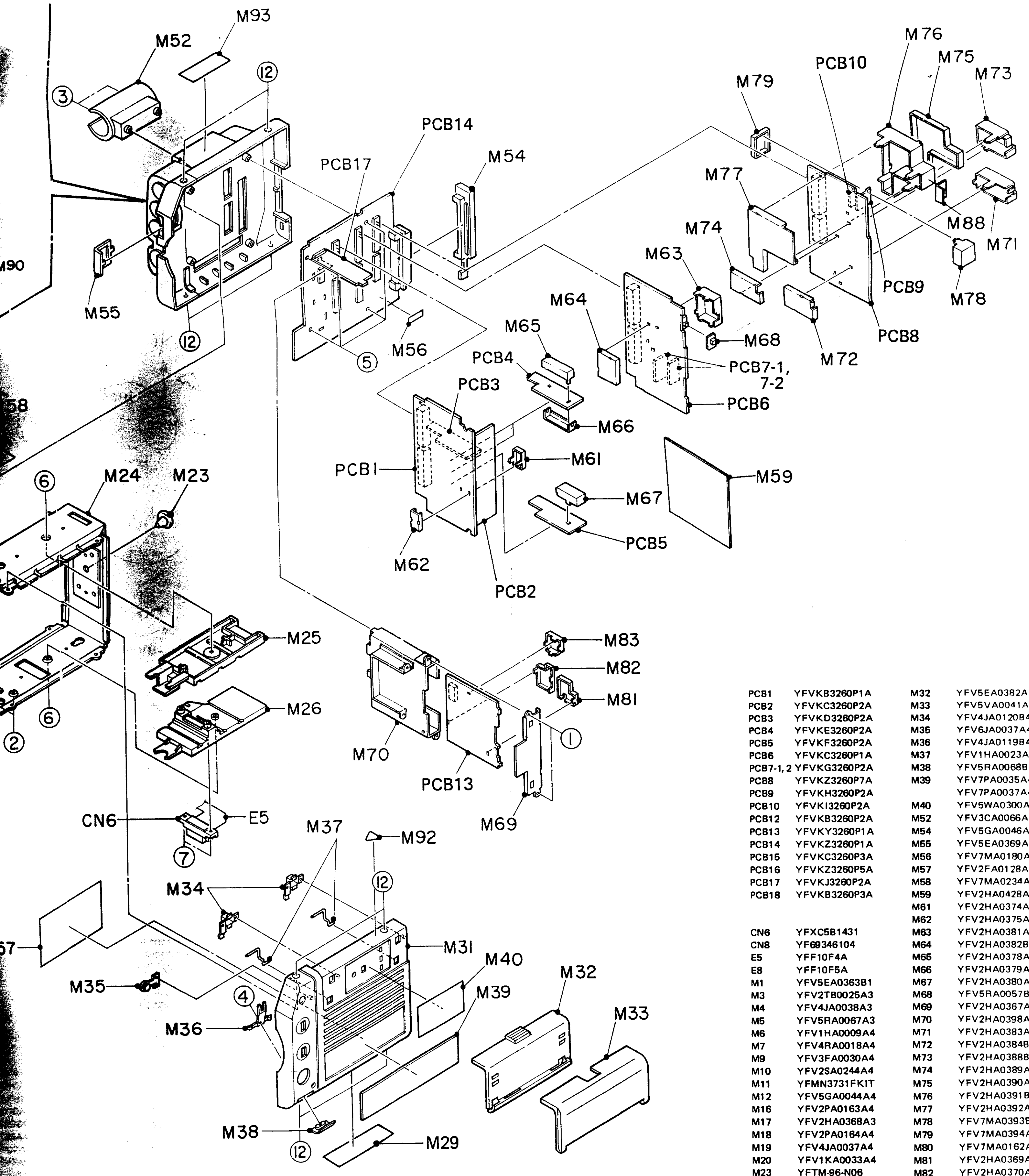

M41
M49
M42
M45
CN1
CN2
CN3
CN4
E4
M43
M46
M53
M44
M90
Serial No. Label
M91
⑦
M47
M92
⑤
M51
PCB18
E2
M48
M50
CN5

○ Numbers show screws.

No.	Screws	Description
①	XSB26+6FX	Binding Head Screws
②	XSB26+6FXK	Binding Head Black Screws
③	XSB26+8FXK	Binding Head Black Screws
④	XTB2+48FX	Binding Head Tapping Screws
⑤	XTB26+8BFX	Binding Head Tapping Screws
⑥	XTB26+6FXK	Binding Head Tapping Black Screws
⑦	XTB26+88FXK	Binding Head Tapping Black Screws
⑧	XTS26+6CFXK	Flush Head Machine Tapping Screws
⑨	XSB26+4FX	Binding Head Screws
⑩	XSN2+4FX	Pan Head Machine Screws
⑪	XSN2+5FX	Pan Head Machine Screws
⑫	XSS26+5FXK	Flush Head Machine Screws
⑬	TSF204530	Flush Head Tapping Screws


M58
②
②
②
M17
⑨
M16
M11
⑩
PCB12
E8
CN8
PCB16
M10
①
M9
M20
①
①
①
①
⑩
M5
M6
⑬
M7
M19
M18
M57
⑪
M4
M1
M3
M12
M87
M86
PCB15

EW OF CAMERA

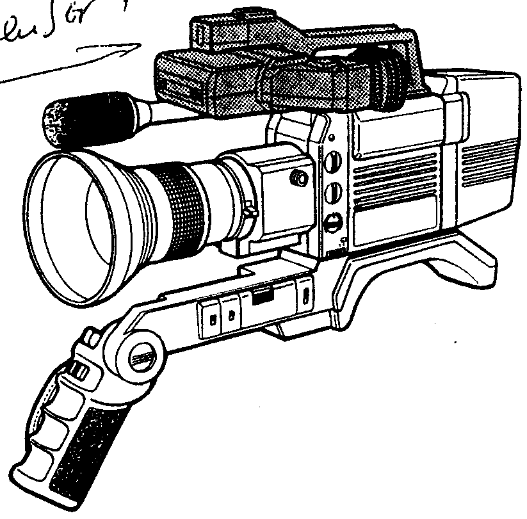

M93
M52
③
⑫
PCB14
PCB17
M54
M55
⑫
90
⑤
M56
58
⑥
M24
M23
M25
M26
⑥
②
CN6
E5
⑦
M37
M92
⑫
M34
M31
M40
M35
④
M36
M39
M32
M33
M38
⑫
M29
57
M76
PCB10
M75
M73
M79
M77
M74
M88
M71
M63
PCB9
M78
M64
M68
M65
PCB4
PCB7-1,
7-2
M72
PCB8
PCB3
PCB6
M66
M61
PCB1
M59
M67
PCB5
M62
PCB2
M83
M82
M81
①
M70
PCB13
M69

PCB1	YFVKB3260P1A	M32	YFV5EA0382A3
PCB2	YFVKC3260P2A	M33	YFV5VA0041A4
PCB3	YFVKD3260P2A	M34	YFV4JA0120B4
PCB4	YFVKE3260P2A	M35	YFV6JA0037A4
PCB5	YFVKF3260P2A	M36	YFV4JA0119B4
PCB6	YFVKC3260P1A	M37	YFV1HA0023A4
PCB7-1, 2	YFVKG3260P2A	M38	YFV5RA0068B4
PCB8	YFVKZ3260P7A	M39	YFV7PA0035A4
PCB9	YFVKH3260P2A		YFV7PA0037A4
PCB10	YFVKI3260P2A	M40	YFV5WA0300A4
PCB12	YFVKB3260P2A	M52	YFV3CA0066A4
PCB13	YFVKY3260P1A	M54	YFV5GA0046A4
PCB14	YFVKZ3260P1A	M55	YFV5EA0369A3
PCB15	YFVKC3260P3A	M56	YFV7MA0180A4
PCB16	YFVKZ3260P5A	M57	YFV2FA0128A4
PCB17	YFVKJ3260P2A	M58	YFV7MA0234A4
PCB18	YFVKB3260P3A	M59	YFV2HA0428A4
		M61	YFV2HA0374A4
		M62	YFV2HA0375A4
CN6	YFXC5B1431	M63	YFV2HA0381A4
CN8	YF69346104	M64	YFV2HA0382B4
E5	YFF10F4A	M65	YFV2HA0378A4
E8	YFF10F5A	M66	YFV2HA0379A4
M1	YFV5EA0363B1	M67	YFV2HA0380A4
M3	YFV2TB0025A3	M68	YFV5RA0057B4
M4	YFV4JA0038A3	M69	YFV2HA0367A4
M5	YFV5RA0067A3	M70	YFV2HA0398A3
M6	YFV1HA0009A4	M71	YFV2HA0383A4
M7	YFV4RA0018A4	M72	YFV2HA0384B4
M9	YFV3FA0030A4	M73	YFV2HA0388B4
M10	YFV2SA0244A4	M74	YFV2HA0389A4
M11	YFMN3731FKIT	M75	YFV2HA0390A4
M12	YFV5GA0044A4	M76	YFV2HA0391B4
M16	YFV2PA0163A4	M77	YFV2HA0392A4
M17	YFV2HA0368A3	M78	YFV7MA0393B4
M18	YFV2PA0164A4	M79	YFV7MA0394A4
M19	YFV4JA0037A4	M80	YFV7MA0162A4
M20	YFV1KA0033A4	M81	YFV2HA0369A4
M23	YFTM-96-N06	M82	YFV2HA0370A4
M24	YFV5KA0074A2	M83	YFV2HA0371A4
M25	YFV3CA0067A3	M86	YFV5RA0069A4
M26	YFV3CA0068A3	M87	YFV5RA0070A4
M29	YFV7MA0099A4	M88	YFV2PA0176A4
M31	YFV5EA0364B1	M93	YFV7MA0106A4
	YFV5EB0364B1		

ELECTRONIC VIEWFINDER (WV-VF01)

ATW Sensor komplett

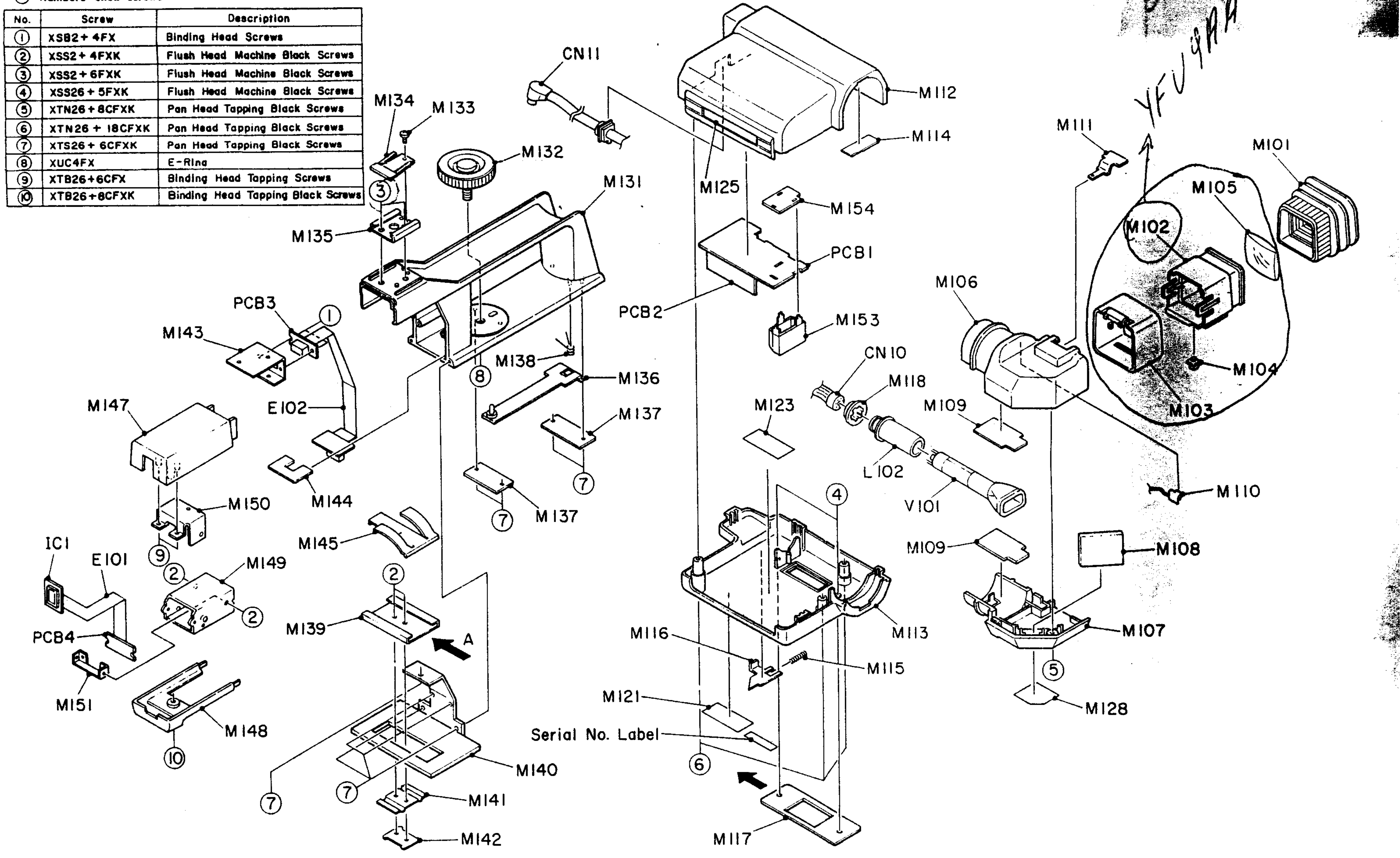
YFVAKA0470AN



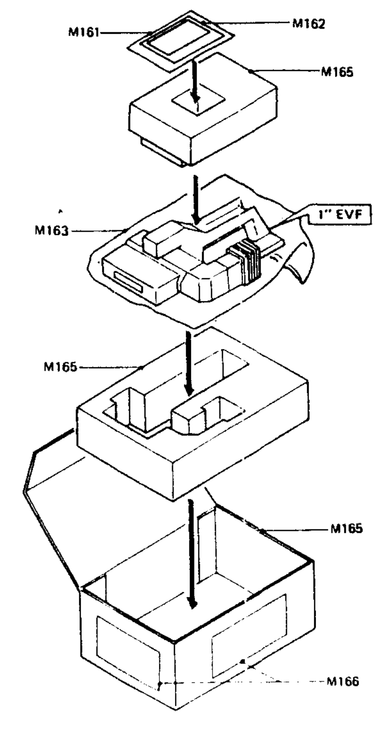
○ Numbers show screws

No.	Screw	Description
①	XSB2+4FX	Binding Head Screws
②	XSS2+4FXK	Flush Head Machine Black Screws
③	XSS2+6FXK	Flush Head Machine Black Screws
④	XSS26+5FXK	Flush Head Machine Black Screws
⑤	XTN26+8CFXK	Pan Head Tapping Black Screws
⑥	XTN26+18CFXK	Pan Head Tapping Black Screws
⑦	XTS26+6CFXK	Pan Head Tapping Black Screws
⑧	XUC4FX	E-Ring
⑨	XTB26+6CFX	Binding Head Tapping Screws
⑩	XTB26+8CFXK	Binding Head Tapping Black Screws

YFV9AA0303AN


CN11
M134
M133
M132
M131
M135
M112
M114
M125
M154
PCB1
PCB2
M153
CN10
M118
M123
M109
L102
V101
M111
M101
M105
M102
M106
M104
M103
M110
M108
M107
M128
PCB3
M143
M147
E102
M138
M136
M137
M144
M150
M145
IC1
E101
M149
PCB4
M151
M148
M139
A
M140
M141
M142
M113
M116
M115
M121
Serial No. Label
M117
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩

PCB1	YFVKBVF01E1A	M123	YFV7MA0217A4
PCB2	YFVKCVF01P1A	M125	NA526PB7G NA527NB8G
PCB3	YFVKZVF01P1A	M128	YFV7MA0218A4
PCB4	YFVKZ3260P6A	M131	YFV5EA0376A2
V101	M03JKF0WW	M132	YFV5RA0071A4
L102	ELY10V301C	M133	YWCC704FM02
CN10	S7-521N-601	M134	YWCC704WM07
CN11	YFE0111J600	M135	YFV5MA0002B4
M101	YFV5GA0043A3	M136	YFV2SA0252A4
M102	YFV5EA0385A3	M137	YFV2CA0115A4
M103	YFV5EA0386A3	M138	YFV4JA0043B4
M104	YFV4RA0017A4	M139	YFV5MA0022A4
M105	YFV1VA0016A4	M140	YFV6FA0058B3
M106	YFV5EA0374A2	M141	YFV4JA0134B4
M107	YFV5EA0375A2	M142	YFV2CA0116A4
M108	YFV1UA0006A4	M143	YFV2SA0253A4
M109	YFV2FA0129A4	M144	YFV1FA0028A4
M110	YFV4JA0068B4	M145	YFV4JA0133A4
M111	YFV4JA0132A4	M147	YFV5EA0370A4
M112	YFV5EA0372A2	M148	YFV5EA0371A4
M113	YFV5EA0373A2	M149	YFV3CA0069A4
M114	YFV4JA0049A4	M150	YFV6FA0056A4
M115	YFV4JA0045A4	M153	YFV2HA0351A3
M116	YFV4RA0016A4	M154	YFV2HA0352A4
M117	YFV2WA0025A4		
M118	YFV2FA0014B4		
M121	YFV7QA1089A4 YFV7QA1090A4		

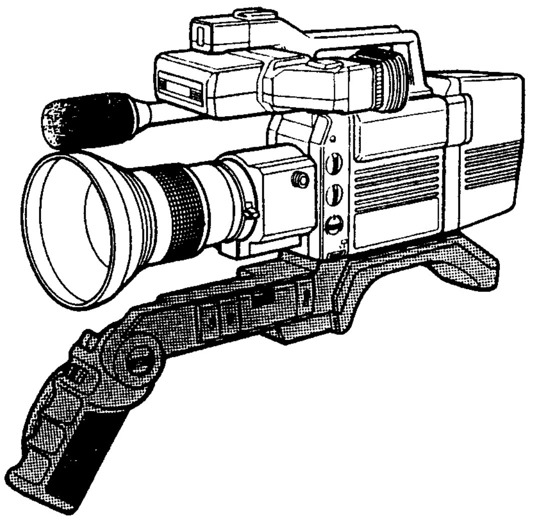

M161
M162
M165
M163
1" EVF
M165
M165
M166

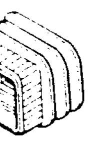
PACKAGING

M161	YFV8QA1054BN YFV8QA1055BN
M162	YWT20X25C03
M163	YWT26X38C03
M165	YFV9CA0851AN
M166	YFV8FA0002A4 YNL1E

EXPLODED VIEW

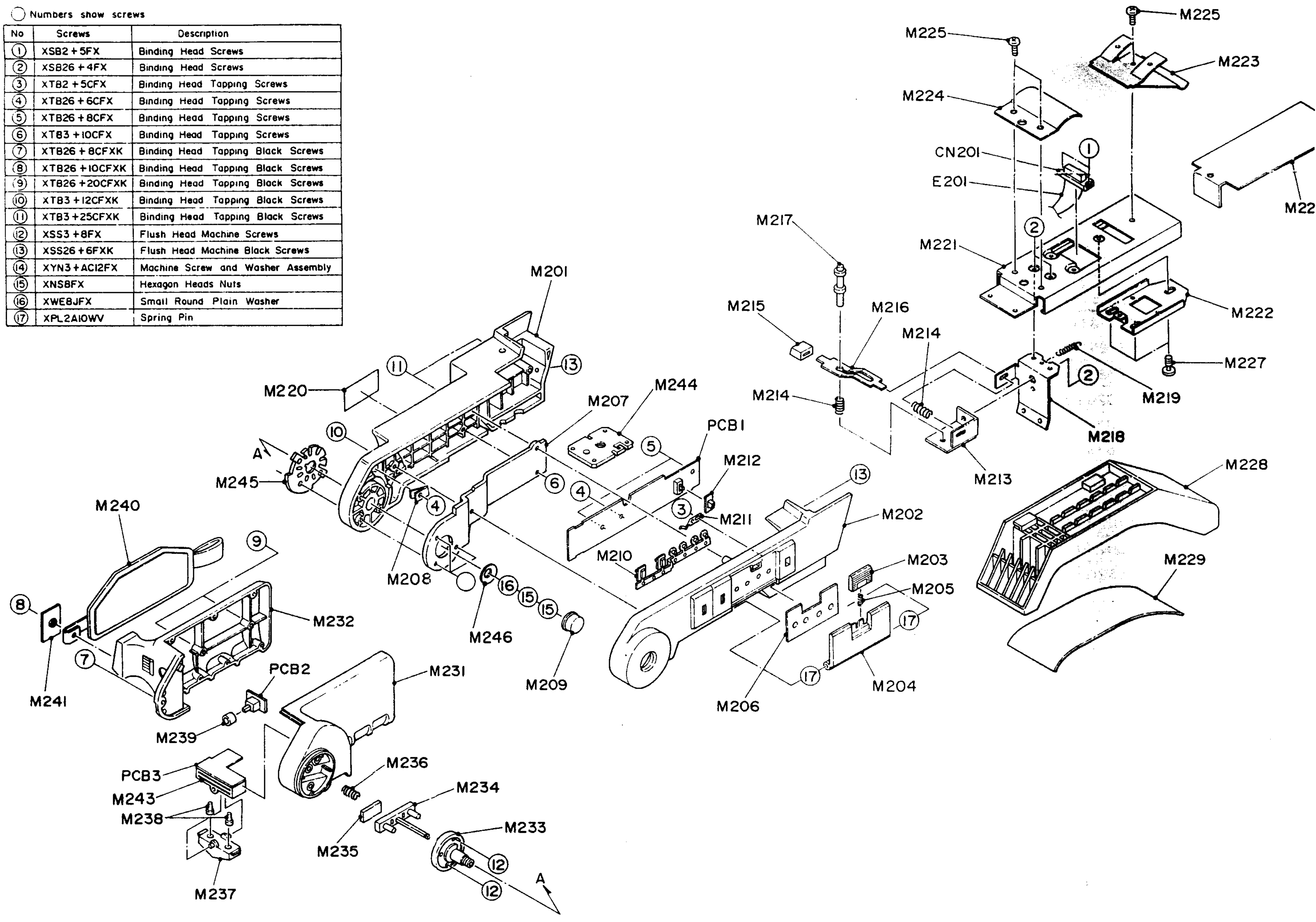
GRIP SHOULDER (WV-GR12)



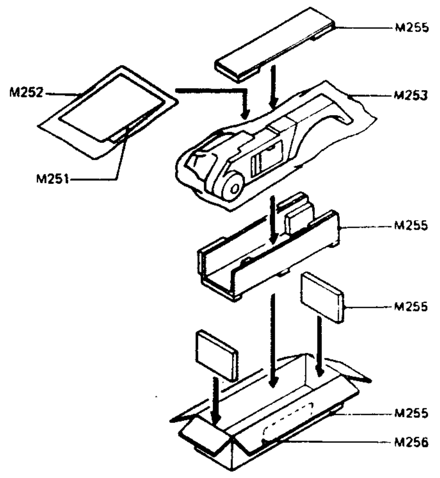


○ Numbers show screws

No	Screws	Description
①	XSB2+5FX	Binding Head Screws
②	XSB26+4FX	Binding Head Screws
③	XTB2+5CFX	Binding Head Tapping Screws
④	XTB26+6CFX	Binding Head Tapping Screws
⑤	XTB26+8CFX	Binding Head Tapping Screws
⑥	XTB3+10CFX	Binding Head Tapping Screws
⑦	XTB26+8CFXK	Binding Head Tapping Black Screws
⑧	XTB26+10CFXK	Binding Head Tapping Black Screws
⑨	XTB26+20CFXK	Binding Head Tapping Black Screws
⑩	XTB3+12CFXK	Binding Head Tapping Black Screws
⑪	XTB3+25CFXK	Binding Head Tapping Black Screws
⑫	XSS3+8FX	Flush Head Machine Screws
⑬	XSS26+6FXK	Flush Head Machine Black Screws
⑭	XYN3+AC12FX	Machine Screw and Washer Assembly
⑮	XNS8FX	Hexagon Heads Nuts
⑯	XWE8JFX	Small Round Plain Washer
⑰	XPL2A10WV	Spring Pin


M225
M225
M223
M224
CN201
①
E201
M22
M217
M221
②
M222
M201
M215
M216
M214
M227
M220
⑪
⑬
M214
②
M219
M244
M207
M218
PCB1
⑩
⑤
M212
A
M245
⑥
④
③
M213
M228
⑬
M211
M240
④
M202
⑨
M210
M203
M208
M229
M205
⑧
M232
⑯
⑮
⑮
⑰
PCB2
M231
M246
⑦
M209
⑰
M204
M241
M206
M239
PCB3
M236
M243
M234
M238
M233
M235
⑫
A
⑫
M237

PCB1	YFVKYGR12P1A
PCB2	YWV3100ZR07
PCB3	YFVKZGR12P1A
M201	YFV4AA0014A1
M202	YFV4AA0015A1
M203	YFV5RA0030C4
M204	YFV5EA0384A4
M205	YFV4JA0045A4
M206	YFV5WA0278A4
M207	YFV2VA0016A4
M208	YWCC702LR01
M209	YFV5RA0010A4
M210	YFV6JA0039B4
M211	YFV4JA0129A4
M212	YFV5RA0007A4
M213	YFV2EA0043A4
M214	YFV4JA0126A4
M215	YFV6JA0012A4
M216	YFV4RA0015A4
M217	YFV1HA0022A4
M218	YFV2EA0042A4
M219	YFV4JA0125A4
M220	YFV7QA1105A
M221	YFV2EA0044A3
M222	YFV6FA0057A4
M223	YFV4JA0127A4
M224	YFV4JA0128A4
M225	YFV1EA0059B4
M226	YFV5WA0277A4
M227	YWV3030FM01
M228	YFV5VA0042A2
M229	YFV5VA0044B4
M231	YFV5JA0011A2
M232	YFV5JA0012A2
M233	YFV2TA0027B3
M235	YFV2FA0051A4
M236	YFV4JA0124A4
M237	YFV6JA0038A3
M238	YFV2FA0013B4
M239	YFV6JB0013A4
M240	YFV5YA0024A3
M241	YFV2TA0028B4
M244	YFV1FA0027A4
M245	YFV4EA0008A4
M246	YFV4JA0008A4

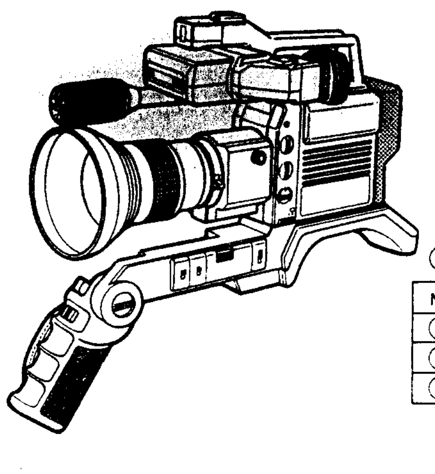

M255
M252
M253
M251
M255
M255
M255
M256

PACKAGING

M251	YFV8QA1056AN
M252	XZB20X25C03
M253	XZB25X60C03
M255	YFV9CA0857BN
M256	YFV8FA0002A4

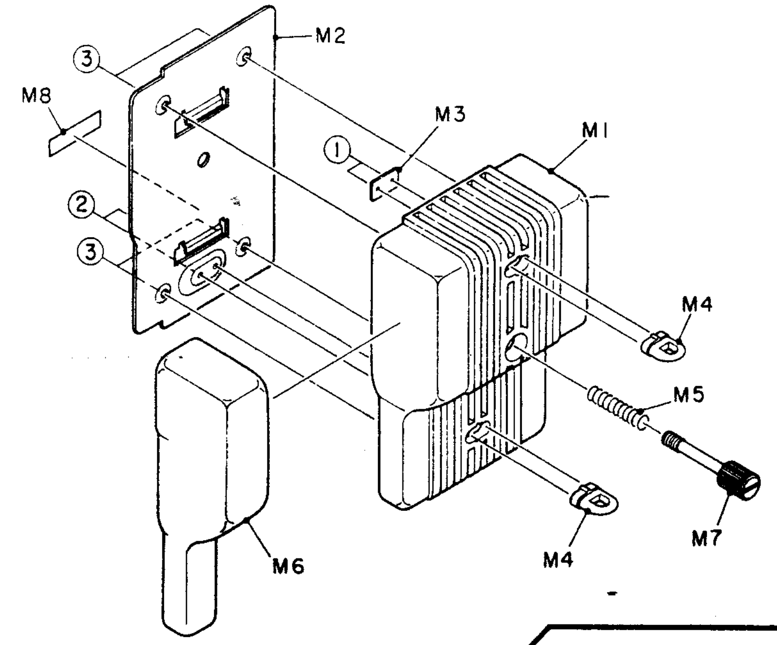
EXPLODED VIEW

CHEEK PAD (WV-Q43)

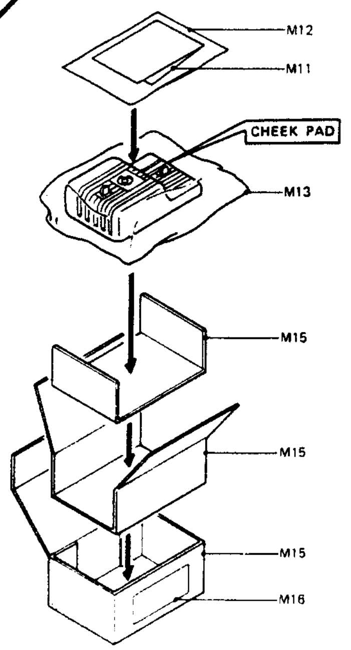


○ Numbers show screws

No.	Screws	Description
①	XSB2 + 6BFX	Binding Head Machine Screws
②	XSB2 + 12BFXK	Binding Head Machine Black Screws
③	XTS3 + 8BFXK	Flush Head Tapping Black Screws


③
M2
M8
M3
①
M1
②
③
M4
M5
M7
M6
M4

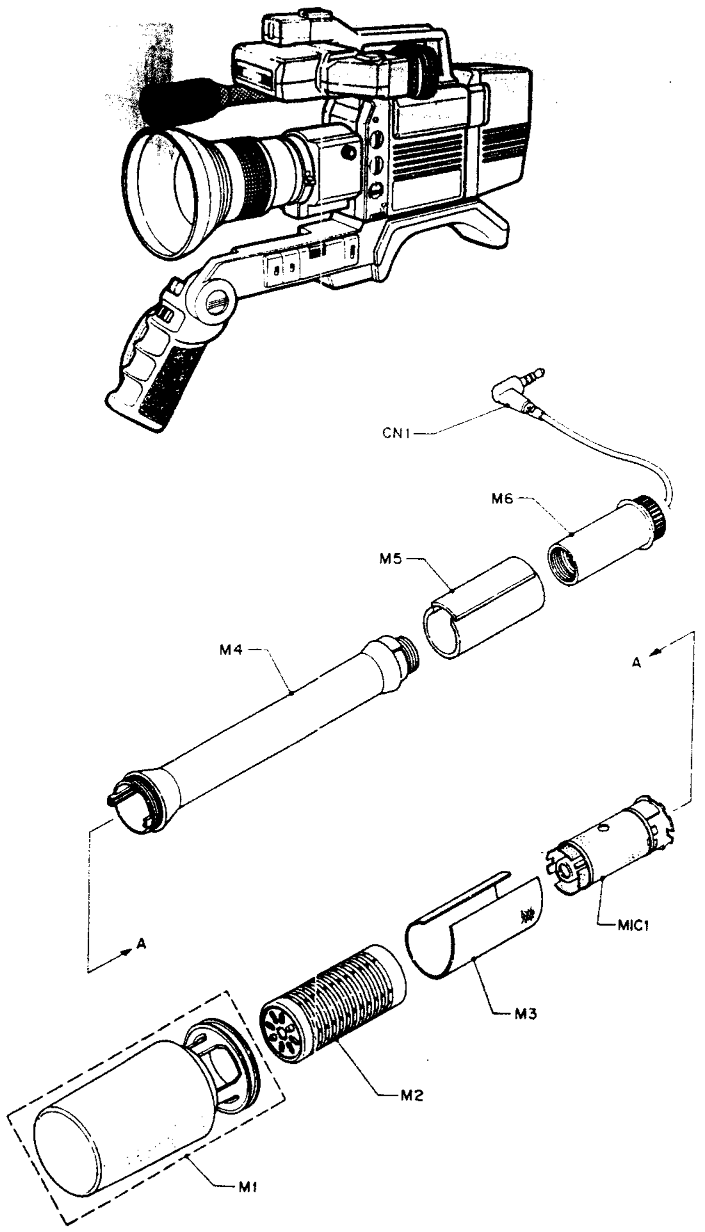
M1	YFV5EA0378A2
M2	YFV5EA0388A4
M3	YFV2SA0255A4
M4	YFV2TA0031A4
M5	YFV4JA0136A4
M6	YFV5VA0043A3
M7	YFV1EA0061A4


M12
M11
CHEEK PAD
M13
M15
M15
M15
M16

PACKAGING

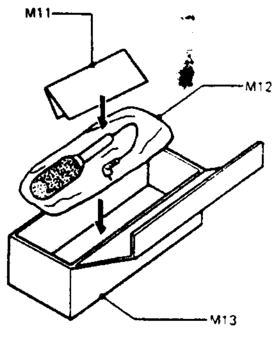
M11	YFV8QA1081AN
M12	YWT20X25C03
M13	YWT15X20C03
M15	YFV9CA0859AN
M16	YFV8FA0078AN

STEREO MICROPHONE (WV-MC12)


CN1
M6
M5
M4
A
MIC1
A
M3
M2
M1

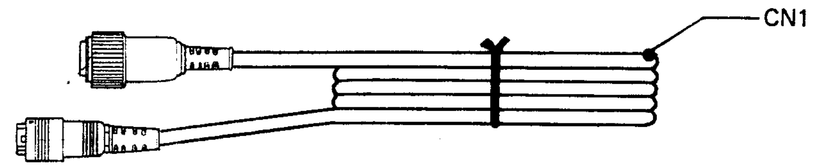
MIC1	YFM0MA0032AN
CN1	YFMLKA0267A4
M1	YFM6CC0020A4
M2	YFM5KA0180A3
M3	YFM7AA0062A4
M4	YFM5KA0592A2
M5	YFM5KA0593A4
M6	YFM2LA0057A4

PACKAGING



M11	YFV8QA1079AN
M12	YPM-PN594AA4
M13	YPM-PN966AA4

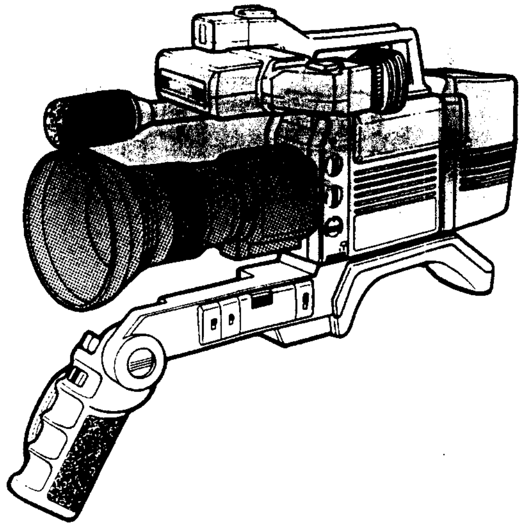
CAMERA CABLE (WV-CA10)



CN1	EMCU10B4T43C

EXPLODED VIEW OF LENS

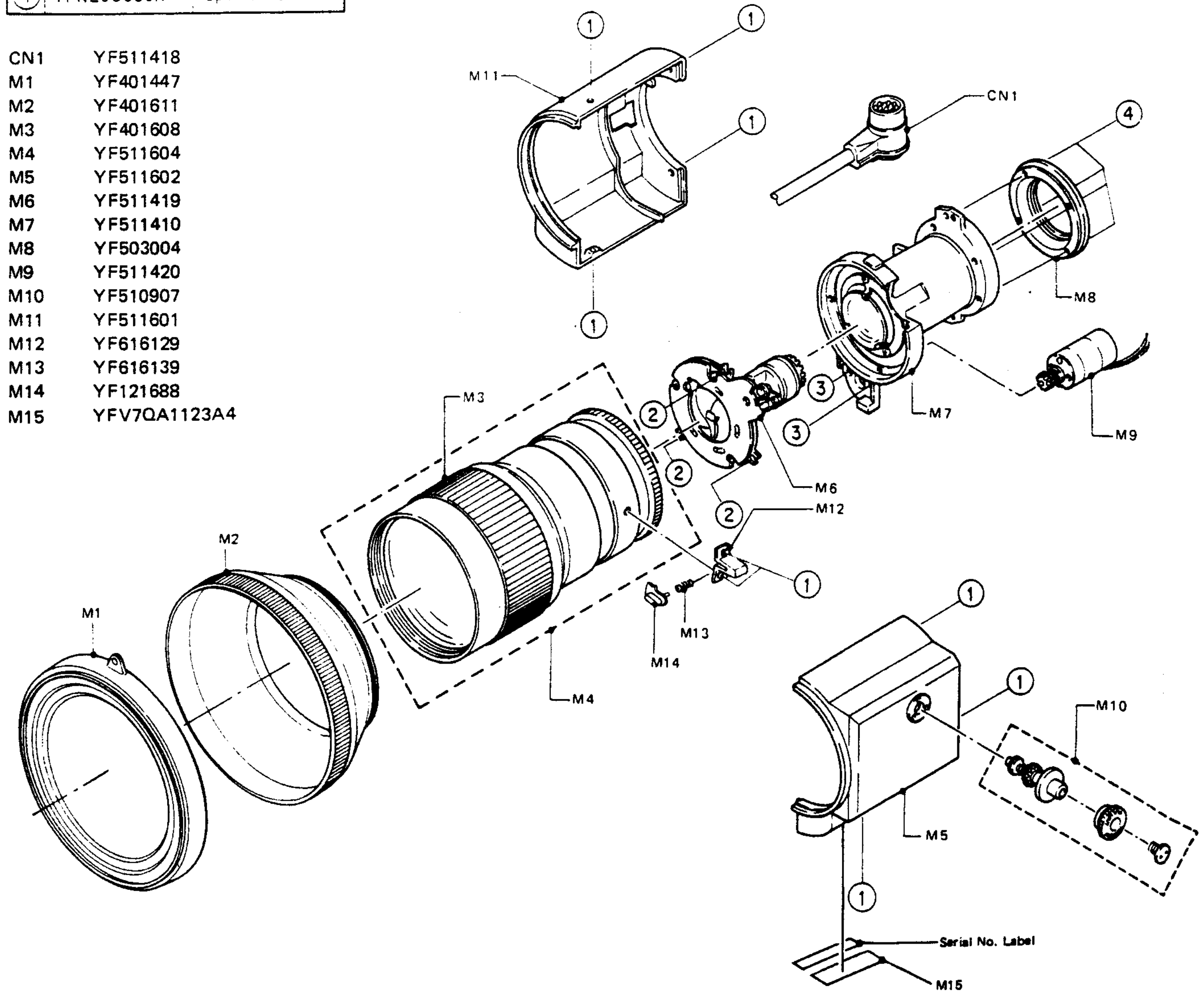
POWER ZOOM LENS (WV-LZ14/12)



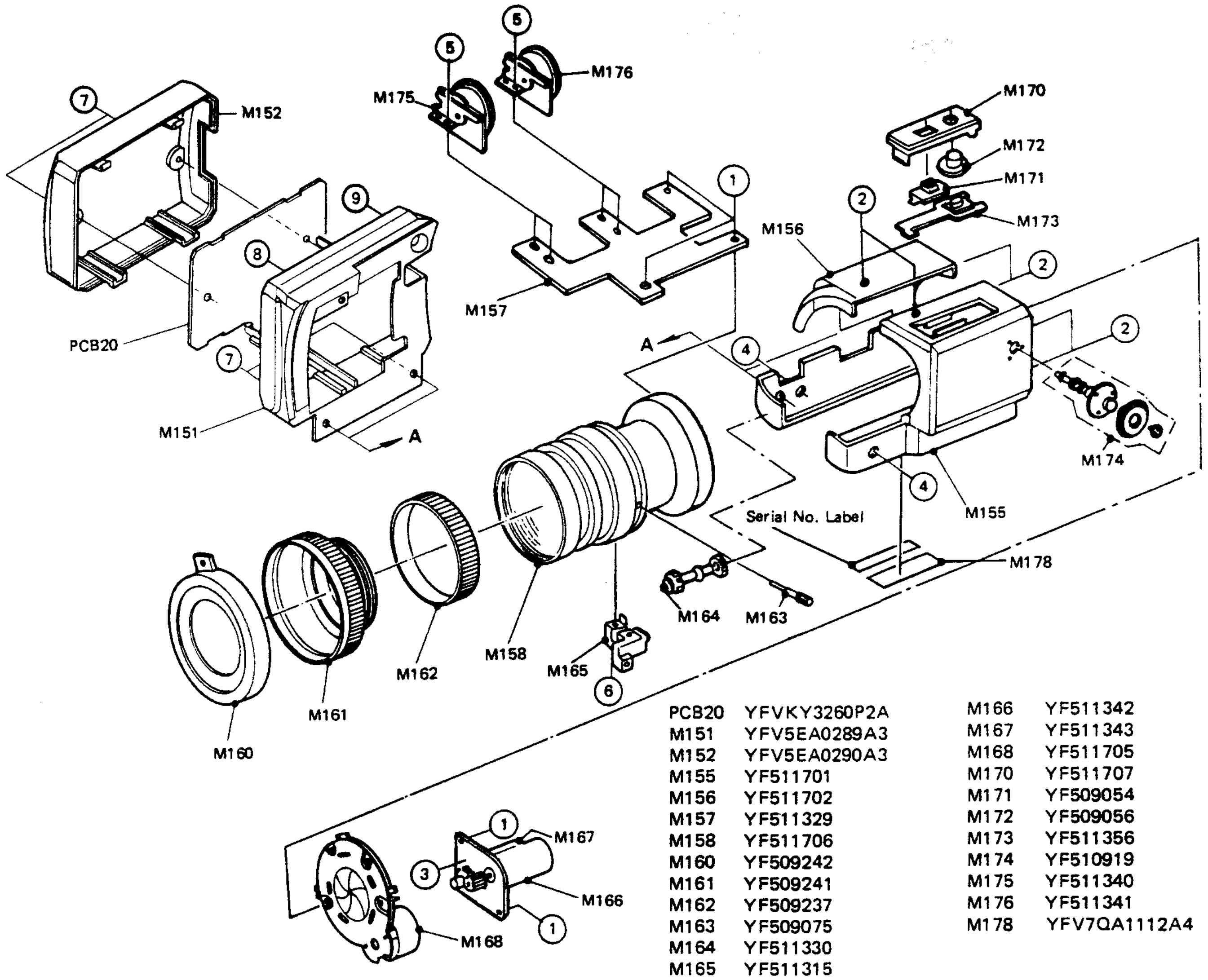
○ Numbers Show Screws

No.	Screws	Description
①	YFN174030KB	Special Screws
②	YFN173025KB	Special Screws
③	YFN174040N	Special Screws
④	YFN205030N	Special Screws

CN1	YF511418
M1	YF401447
M2	YF401611
M3	YF401608
M4	YF511604
M5	YF511602
M6	YF511419
M7	YF511410
M8	YF503004
M9	YF511420
M10	YF510907
M11	YF511601
M12	YF616129
M13	YF616139
M14	YF121688
M15	YFV7QA1123A4


M11
①
①
①
①
CN1
④
M8
M7
M9
③
③
②
②
②
M6
M12
①
M3
M2
M1
M4
M13
M14
①
①
M10
M5
①
Serial No. Label
M15

AUTO FOCUS LENS (WV-LZ14/8AF)


⑦
M152
⑨
⑧
PCB20
⑦
M151
A
A
⑤
⑤
M175
M176
①
M157
M170
M172
M171
M173
②
M156
②
②
④
④
M155
M174
Serial No. Label
M178
M160
M161
M162
M158
M164
M163
M165
⑥
①
M167
③
M166
M168
①

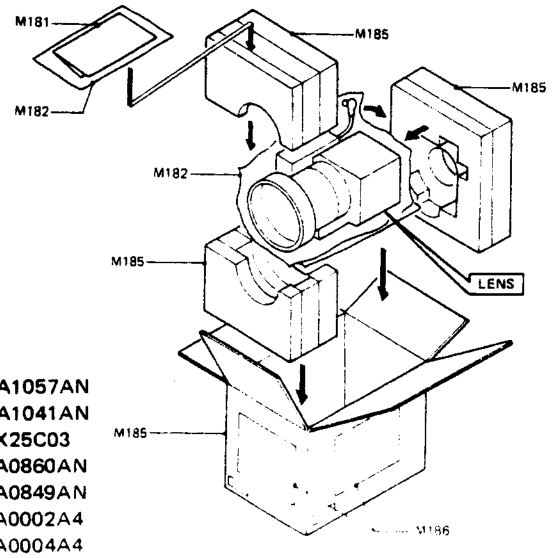
PCB20	YFVKY3260P2A	M166	YF511342
M151	YFV5EA0289A3	M167	YF511343
M152	YFV5EA0290A3	M168	YF511705
M155	YF511701	M170	YF511707
M156	YF511702	M171	YF509054
M157	YF511329	M172	YF509056
M158	YF511706	M173	YF511356
M160	YF509242	M174	YF510919
M161	YF509241	M175	YF511340
M162	YF509237	M176	YF511341
M163	YF509075	M178	YFV7QA1112A4
M164	YF511330		
M165	YF511315		

○ Numbers show screw

No.	Screws	Description
①	YFN203030KB	Pan Head Machine Black Screws
②	YFN205030KB	Pan Head Machine Black Screws
③	YFTP174540N	Pan Head Machine Black Screws
④	YFTP206030KB	Pan Head Machine Black Screws
⑤	YFN172025KB	Pan Head Machine Black Screws
⑥	YFN206035KB	Pan Head Machine Black Screws
⑦	XTN26+8GFXK	Pan Head Tapping Black Screws
⑧	XSB26+4FX	Binding Head Screws
⑨	XTB26+8BFX	Binding Head Tapping Screws

PACKAGING

M181	YFV8QA1057AN YFV8QA1041AN
M182	YWT20X25C03
M185	YFV9CA0860AN YFV9CA0849AN
M186	YFV8FA0002A4 YFV8FA0004A4

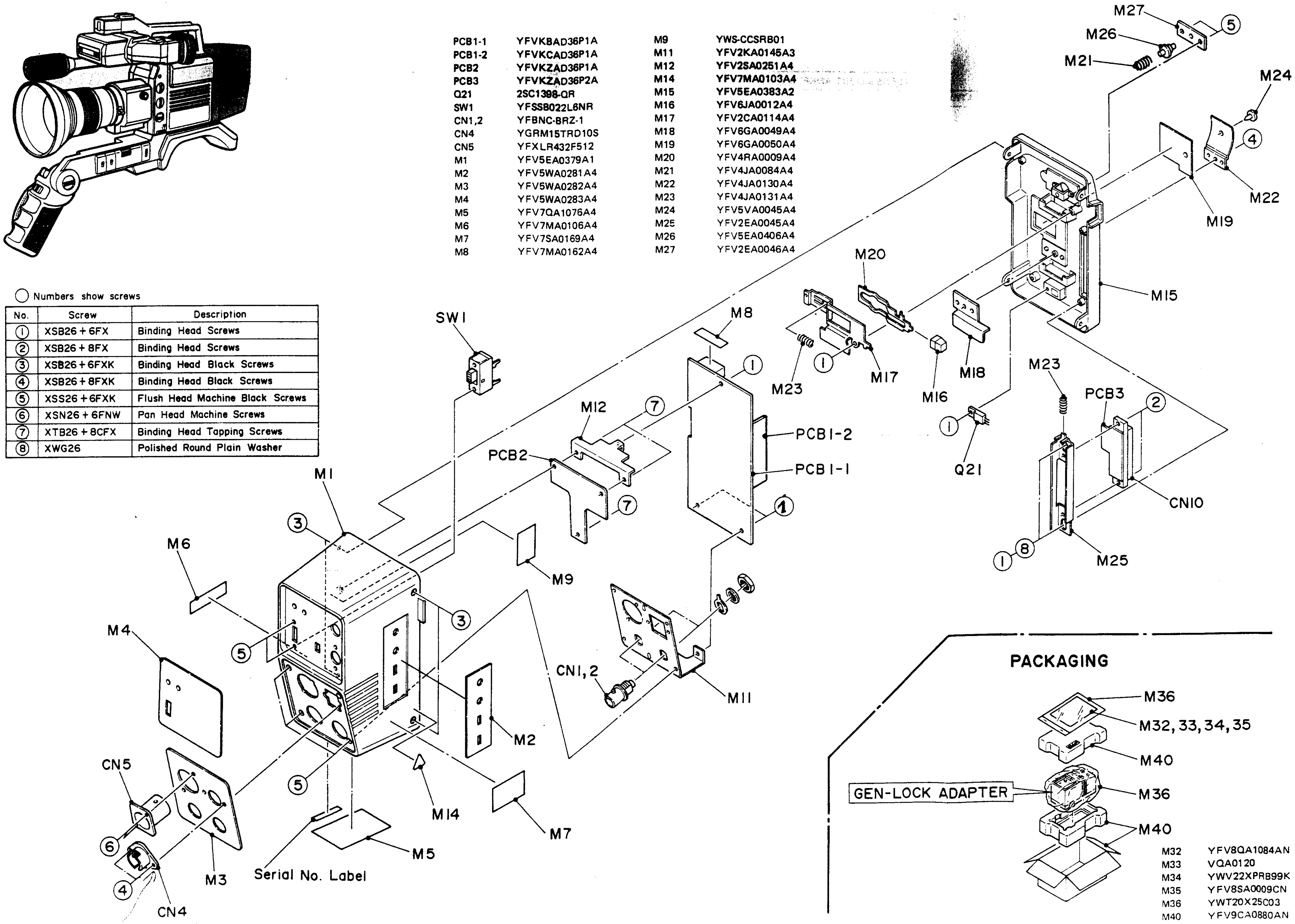

M181
M182
M185
M185
M182
M185
LENS
M185
M186

EXPLODED VIEW OF GEN-LOCK ADAPTOR (WV-AD36)

PCB1-1	YFVKBAD36P1A
PCB1-2	YFVKCAD36P1A
PCB2	YFVKZAD36P1A
PCB3	YFVKZAD36P2A
Q21	2SC1398-QR
SW1	YFSSB022L6NR
CN1,2	YFBNC-BRZ-1
CN4	YGRM15TRD10S
CN5	YFXLR432F512
M1	YFV5EA0379A1
M2	YFV5WA0281A4
M3	YFV5WA0282A4
M4	YFV5WA0283A4
M5	YFV7QA1076A4
M6	YFV7MA0106A4
M7	YFV7SA0169A4
M8	YFV7MA0162A4
M9	YWS-CCSRB01
M11	YFV2KA0145A3
M12	YFV2SA0251A4
M14	YFV7MA0103A4
M15	YFV5EA0383A2
M16	YFV6JA0012A4
M17	YFV2CA0114A4
M18	YFV6GA0049A4
M19	YFV6GA0050A4
M20	YFV4RA0009A4
M21	YFV4JA0084A4
M22	YFV4JA0130A4
M23	YFV4JA0131A4
M24	YFV5VA0045A4
M25	YFV2EA0045A4
M26	YFV5EA0406A4
M27	YFV2EA0046A4

○ Numbers show screws

No.	Screw	Description
①	XSB26 + 6FX	Binding Head Screws
②	XSB26 + 8FX	Binding Head Screws
③	XSB26 + 6FXK	Binding Head Black Screws
④	XSB26 + 8FXK	Binding Head Black Screws
⑤	XSS26 + 6FXK	Flush Head Machine Black Screws
⑥	XSN26 + 6FNW	Pan Head Machine Screws
⑦	XTB26 + 8CFX	Binding Head Tapping Screws
⑧	XWG26	Polished Round Plain Washer


M27
⑤
M26
M21
M24
④
M22
M19
M20
M15
M8
SW1
①
M23
①
M17
M16
M18
M23
PCB3
②
M12
⑦
PCB1-2
PCB1-1
PCB2
①
Q21
M1
⑦
①
CN10
③
M6
M9
①
⑧
M25
③
M4
⑤
CN1,2
M11
M2
CN5
⑤
⑥
M14
M7
M5
M3
④
Serial No. Label
CN4
M36
M32, 33, 34, 35
M40
GEN-LOCK ADAPTER
M36
M40

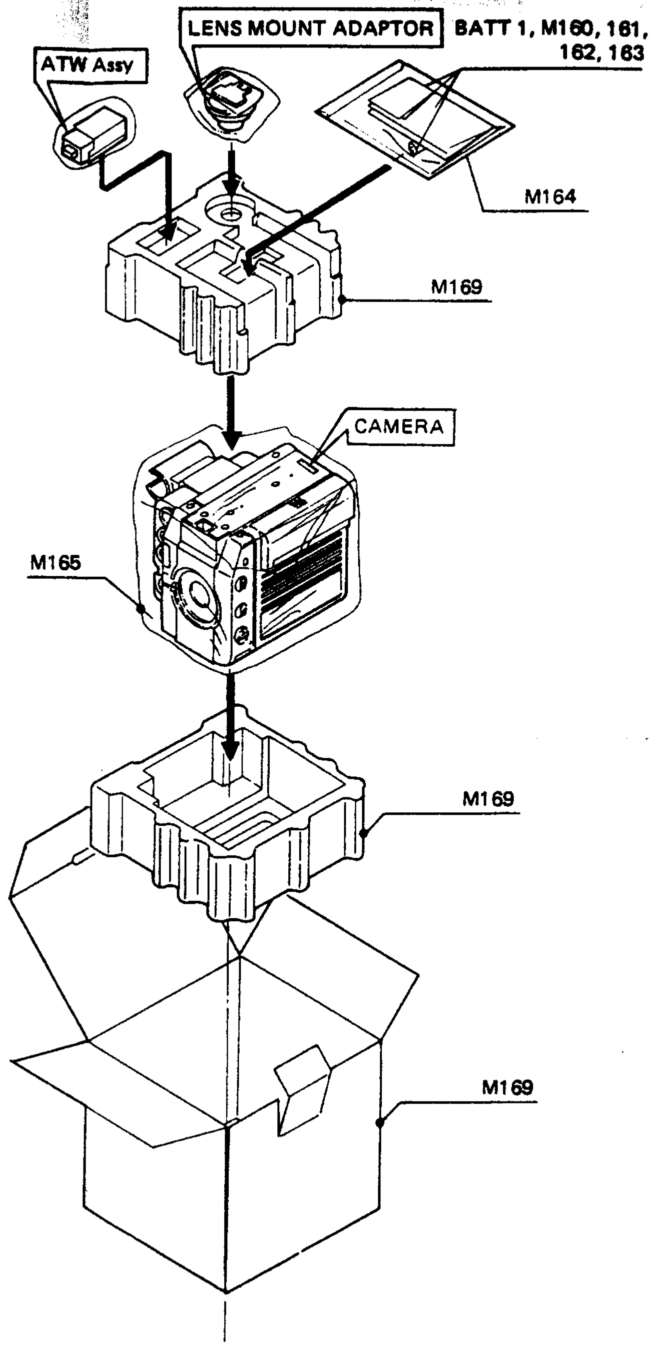
PACKAGING

M32	YFV8QA1084AN
M33	VQA0120
M34	YWV22XPRB99K
M35	YFV8SA0009CN
M36	YWT20X25C03
M40	YFV9CA0880AN

EYCTA 544C0[illegible]

PACKAGING

SYSTEM CAMERA (WVP-F10)


LENS MOUNT ADAPTOR
BATT 1, M160, 161, 162, 163
ATW Assy
M164
M169
CAMERA
M165
M169
M169

BATT 1	UM-4NEPBARA
M160	YFV8QA1097AN YFV8QA1098AN YFV8QA1099AN
M161	VQA0120-3
M162	YWV22XPRB99K
M163	YFV8SA0009CN
M164	XZB26X40C05
M165	XZB45X63C05
M166	YWT20X25C03
M167	YWT10X35C03
M168	YWT10X16C03
M169	YFV9CA0874AN YFV9CA0887AN

10455

ORDER NO. AVS9406863P8

Parts Change Notice

Model No. WV-AD36

Subject : Correction

Effective From : ALL

Please revice the original parts list in the Service Manual to conform to the change(s) shown herein.
If new part numbers are shown, be sure to use them when ordering parts

Reason for Change * The circled item indicates the reason

1. Improve performance
2. Change of material or dimension
3. To meet approved specification
4. Standardization
5. Addition
6. Deletion
[✓ 7. Correction]
8. Other

Interchangeability Code ** The circled item indicates the interchangeability. If no marking, see the Notice in the bottom column *

	Parts	Set Production	
A	Original New	Early Late	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.
B	Original New	Early Late	Original parts may be used in early or late production set only. New parts may be use in early or late production sets. Use original parts where possible, then stock new parts.
C	Original New	Early Late	New parts only may be used in ealy or late production sets. Stock new parts.
D	Original New	Early Late	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
[✓ E]	Other		

Part Number Parts identified by ▮ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.Parts identified by o mark are new parts used from this Parts Change Notice.

Ref No.	Original Part No.	New Part No.	Notes (*,**)	Part Name & Descriptions	Price
CN4	YGRM15TRD10S	EMCTM819C06V	7, E	SEG Connector Assy	

File this Parts Change Notice with your copy of the Service Manual

Panasonic

Printed in JAPAN
C-449 Ⓕ 5

ORDER NO. BSD9810050P8

Parts Change Notice

Subject : Correction

Model No. WV-LZ14/8AF

Effective From : Serial No. ALL

Please revise the original parts list in the Service Manual to conform to the change(s) shown herein.
If new part numbers are shown, be sure to use them when ordering parts.

Reason for Change * The circled item indicates the reason. If no marking, see the Notes in the bottom column.

1. Improve performance
2. Change of material or dimension
3. To meet approved specification
4. Standardization
5. Addition
6. Deletion
[✓ 7. Correction]
8. Other

Interchangeability Code ** The circled item indicates the interchangeability. If no marking, see the Notes in the bottom column.

	Parts	Set Production	
A	Original New	Early Late	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.
B	Original New	Early Late	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
[✓ C]	Original New	Early Late	New parts only may be used in early or late production sets. Stock new parts.
D	Original New	Early Late	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
E	Other		

Part Number Parts identified by ▮ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts. Parts identified by o mark are new parts used from this Parts Change Notice.

Ref No.	Original Part No.	New Part No.	Notes (*, **)	Part Name & Descriptions	Price
		MISCELLANEOUS			
M151	YFV5EA0289A3	YFV5EA0290A3	7, C	Cover	
M152	YFV5EA0290A3	YFV5EA0289A3	7, C	Cover	

File this Parts Change Notice with your copy of the Service Manual

Panasonic

Printed in Japan
H-024 N 12. 23

ORDER NO. VKD86111026S8

Service Manual

Supplement-1

System Camera
WVP-F10

8X Auto Focus Lens
WV-LZ14/8AF

1" Electronic Viewfinder
WV-VF01

Grip Shoulder
WV-GR12

Gen-lock Adaptor
WV-AD36

12X Power Zoom Lens
WV-LZ14/12

- Please file this supplement service manual with the service manual Order No. VKD86101016C1.

CONTENTS

LIST OF MODIFICATION 1
CCD AND CCD DRIVE BOARD (WVP-F10) 2
MOTHER BOARD (WVP-F10) 4
GEN-LOCK ADAPTOR WV-AD36 5
PROCESS BOARD (WVP-F10) 6
MICROPROCESSOR BOARD (WVP-F10) 7
AUTOFOCUS BOARD (WV-LZ14/8AF) 8
POWER/SYNC BOARD (WVP-F10) 9
REPLACEMENT PARTS LIST 10

National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

LIST OF MODIFICATION

WVP-F10

◆ **Process Board (On page 6)**
- Process board has been changed as shown on page 6.
- The parts number have been changed as shown in the parts list.

◆ **Microprocessor Board (On page 7)**
- Microprocessor board has been changed as shown on page 7.
- Resistor R111 has been changed to improve the auto focus.
- The parts number have been changed as shown in the parts list.

◆ **Power/Sync Board (On page 9)**
- Power/Sync board ;has been changed as shown on page 9.
- Capacitor C37 has been removed to stabilize the pedestal level.
- The parts number have been changed as shown in the parts list.

◆ **CCD Drive Board (On page 3)**
- CCD Drive board has been changed as shown on page 3.
- Capacitor C26 has been added to improve the white balance.
- The part number has been changed as shown in the parts list.

◆ **CCD Board (On page 3)**
- Resistor R17, R18 and R20 have been changed to eliminate the vertical interference line
- The parts number have been changed as shown in the parts list.

◆ **Process VIC-1 Board (On page 6)**
- Capacitor C32 has been added and resistor R34 has been changed to shifting the adjusting range of the burst phase.

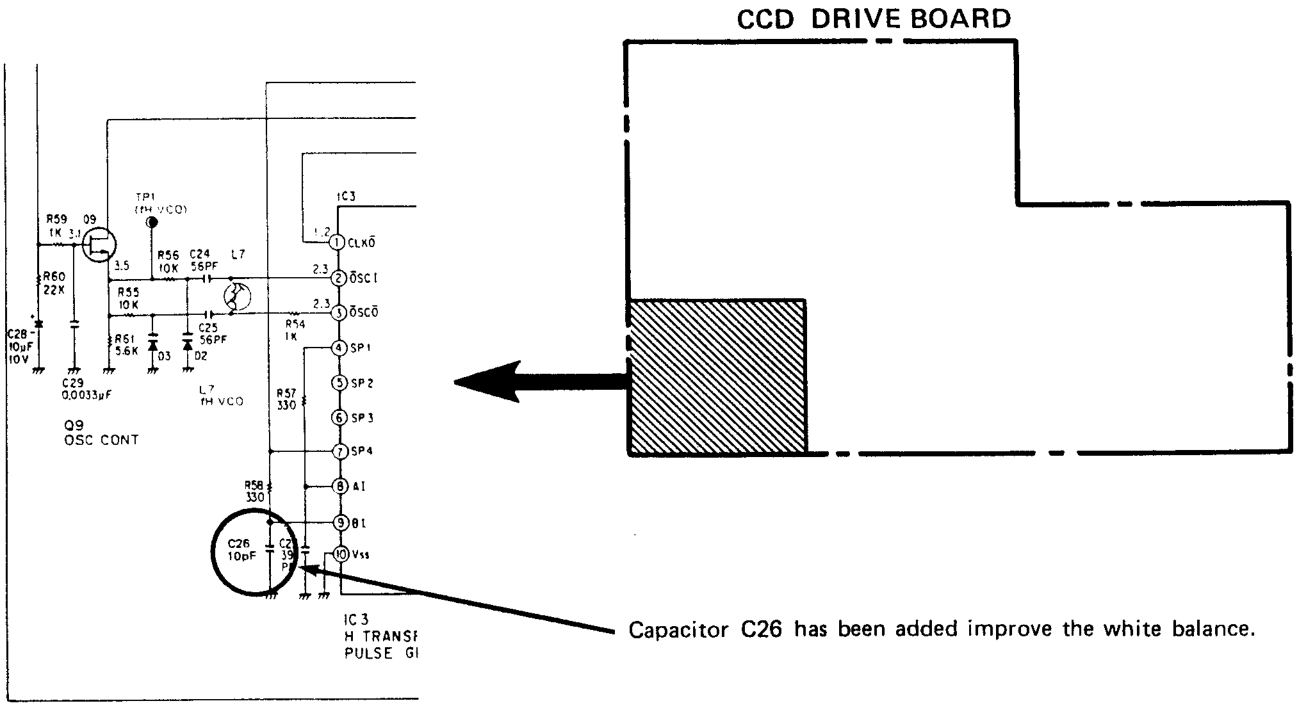
◆ **Process VIC-2 Board (On page 6)**
- Process VIC-2 board has been changed as shown on page 6.

WV-LZ14/8AF

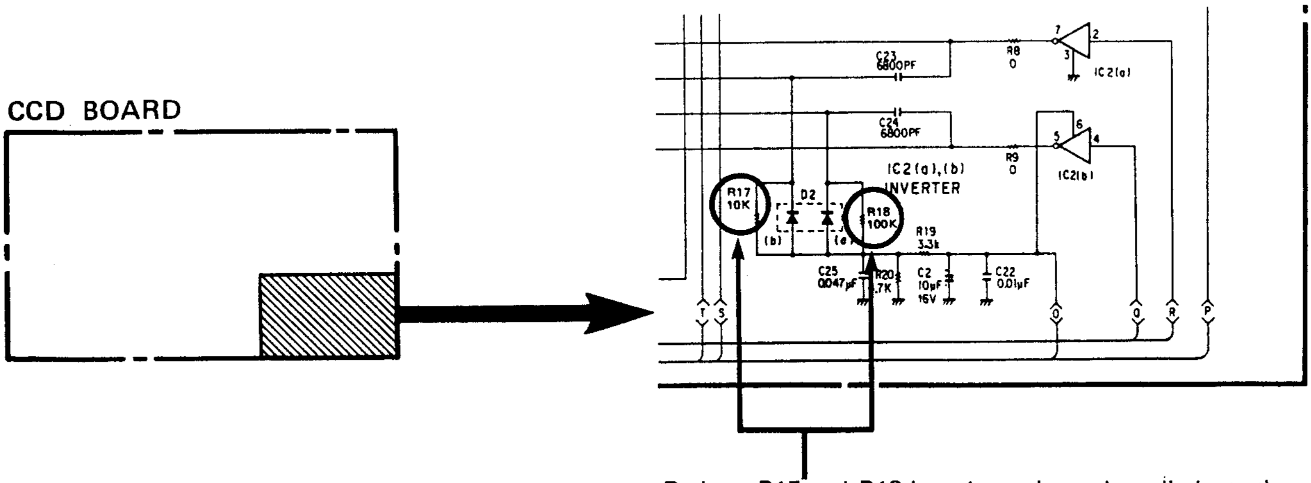
◆ **Auto Focus Board (On page 8)**
- Auto Focus board has been changed as shown on page 8.
- Capacitor C75 has been added to improve the autofocus.
- The parts number have been changed as shown in the parts list.

WV-AD36

◆ **Main Board (On page 9)**
- Main board has been changed as shown on page 9.
- Resistor R67 has been changed to shifting the adjusting range of the H.phase.
- The part number has been changed as shown in the parts list.


CCD DRIVE BOARD
TP1
(fH VCO)
R59 1K
Q9
3.1
3.5
R60 22K
C28 10μF 10V
C29 0.0033μF
R56 10K
C24 56PF
L7
R55 10K
C25 56PF
R61 5.6K
D3
D2
L7
fH VCO
Q9
OSC CONT
IC3
1.2
2.3
2.3
R54 1K
R57 330
R58 330
C26 10pF
C2 39 P
① CLKO
② OSCI
③ OSCO
④ SP1
⑤ SP2
⑥ SP3
⑦ SP4
⑧ AI
⑨ BI
⑩ Vss
IC3
H TRANSF
PULSE GI

Capacitor C26 has been added improve the white balance.


CCD BOARD
C23 6800PF
R8 0
IC2(a)
C24 6800PF
R9 0
IC2(b)
IC2(a),(b) INVERTER
R17 10K
D2
(b)
(a)
R18 100K
R19 3.3k
C25 0.047μF
R20 4.7K
C2 10μF 16V
C22 0.01μF
T
S
O
Q
R
P

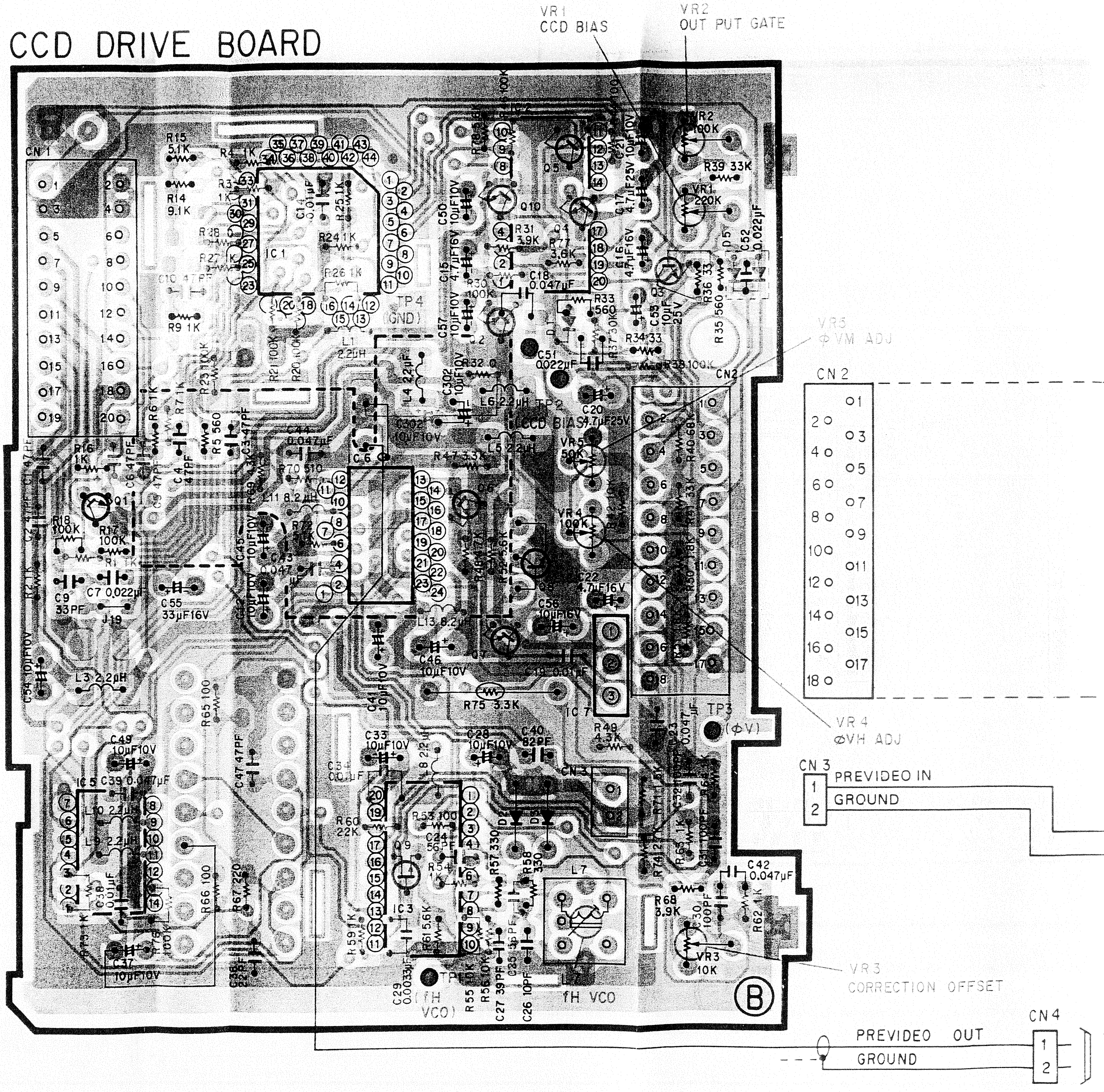
Resistor R17 and R18 have been changed to eliminate the vertical ghost line.
R17 from 510k ohms to 10k ohms R18 from 510k ohms to 100k ohms.

CONDUCTOR VIEW OF CCD AND CCD DRIVE BOARD

CN 1 (TO MOTHER BOARD --- CN 1)

1	NOT USED	2	GROUND
3	GROUND	4	GROUND
5	+4.9V IN	6	NOT USED
7	+8.6V IN	8	APP IN
9	+16V IN	10	W. HD IN
11	–8V IN	12	Vp IN
13	CP 5 OUT	14	BLK IN
15	CP 3 OUT	16	1/2 fH OUT
17	NOT USED	18	GROUND
19	SES CONT IN	20	R. SC OUT

CCD DRIVE BOARD


VR1
CCD BIAS
VR2
OUT PUT GATE
CN 1
IC 1
TP 4 (GND)
CCD BIAS TP 2
VR 5 φVM ADJ
CN 2
VR 4 φVH ADJ
TP3 (φV)
IC 7
CN 3
PREVIDEO IN
GROUND
IC 5
IC 3
L7
fH VCO
TP1 (fH VCO)
VR 3 CORRECTION OFFSET
B
CN 4
PREVIDEO OUT
GROUND

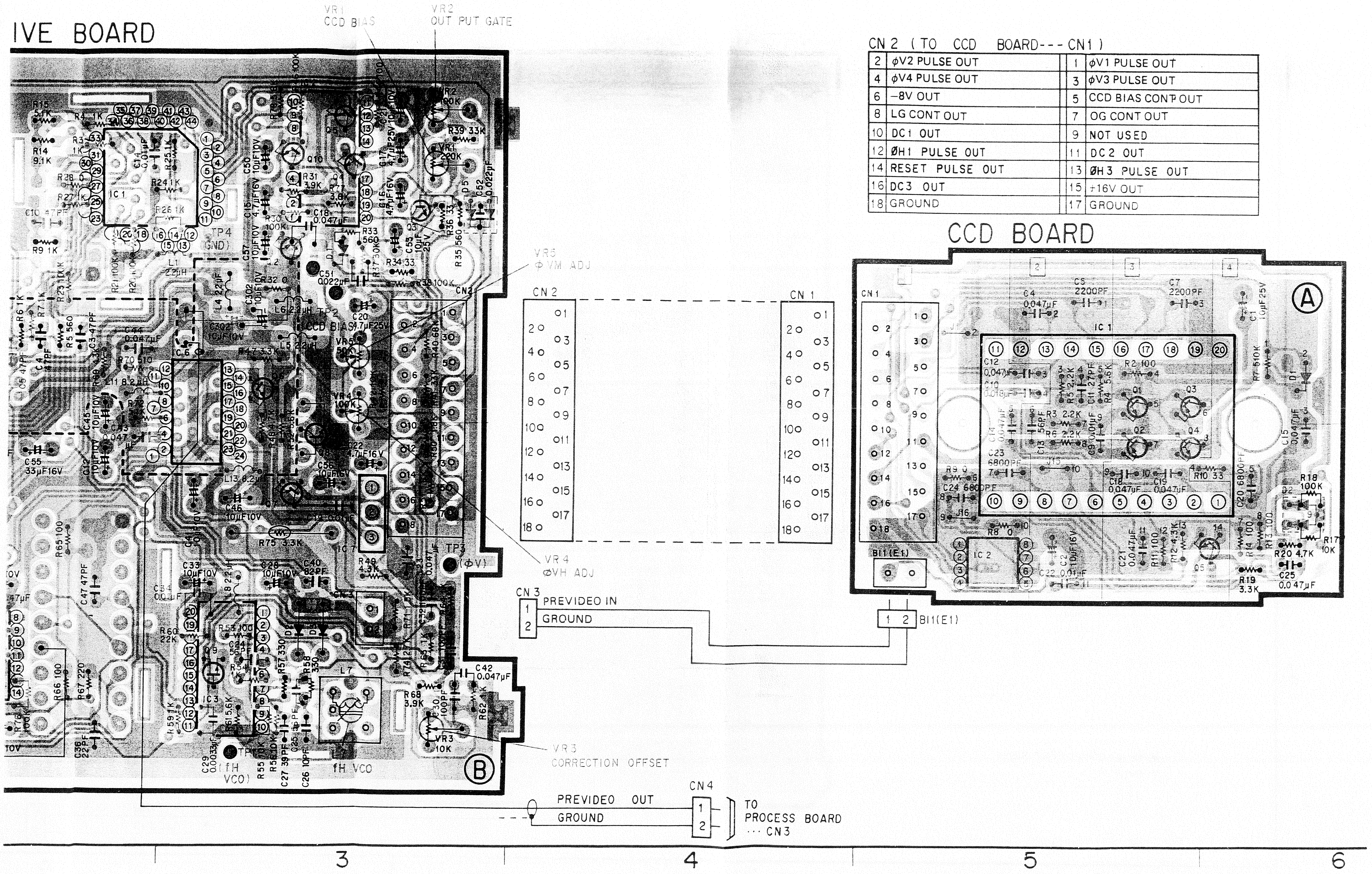
COMPONENT SIDE
PATTERN SIDE

B
A
1
2
3
4

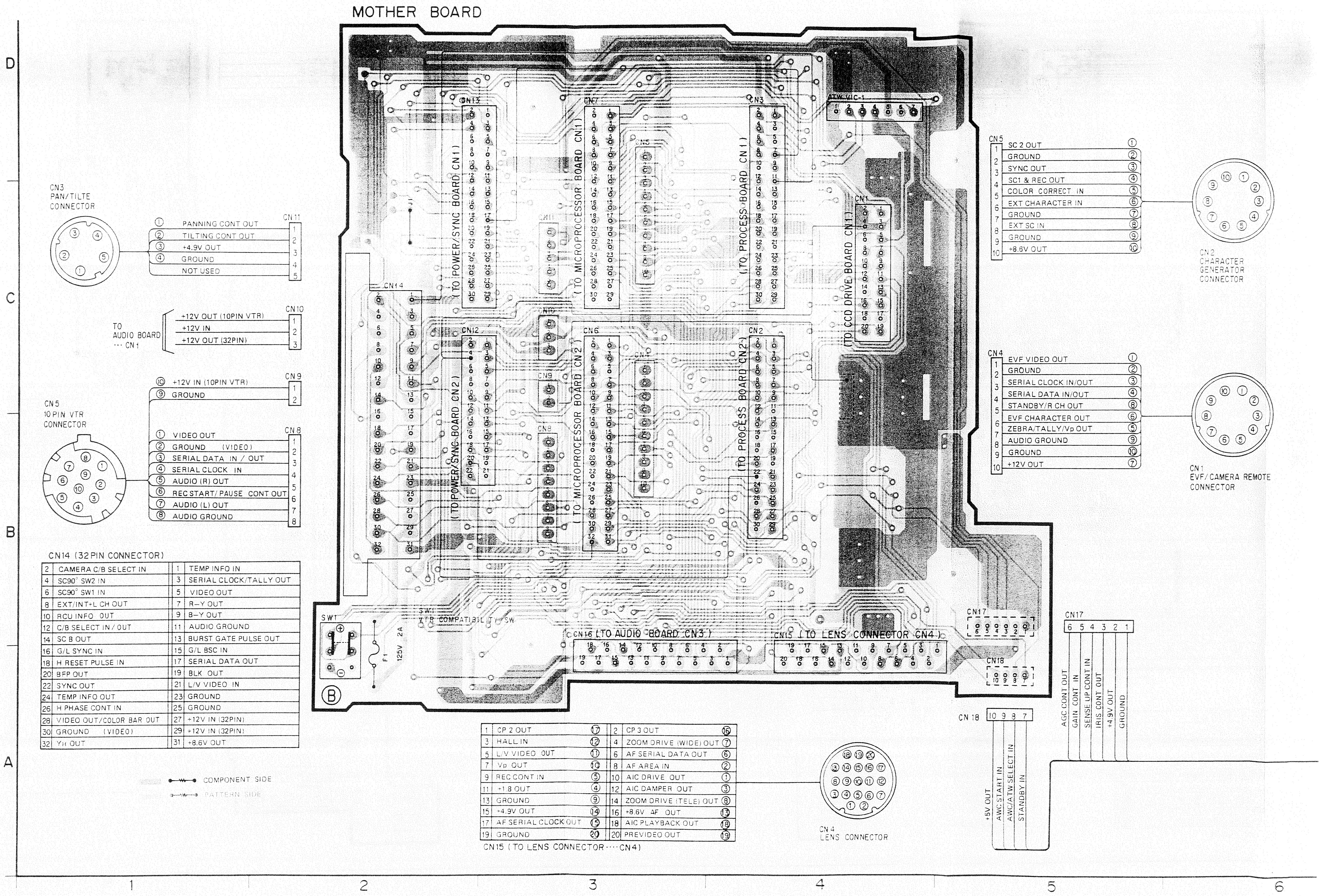
CONDUCTOR VIEW OF CCD AND CCD DRIVE BOARD

CN 2 (TO CCD BOARD--- CN1)

2	φV2 PULSE OUT	1	φV1 PULSE OUT
4	φV4 PULSE OUT	3	φV3 PULSE OUT
6	−8V OUT	5	CCD BIAS CONT OUT
8	LG CONT OUT	7	OG CONT OUT
10	DC1 OUT	9	NOT USED
12	ØH1 PULSE OUT	11	DC2 OUT
14	RESET PULSE OUT	13	ØH3 PULSE OUT
16	DC3 OUT	15	+16V OUT
18	GROUND	17	GROUND


IVE BOARD
VR1
CCD BIAS
VR2
OUT PUT GATE
VR5
φVM ADJ
VR4
φVH ADJ
VR3
CORRECTION OFFSET
fH VCO
B
CN 2
CN 1
CCD BOARD
A
CN1
IC 1
IC 2
CN 3
PREVIDEO IN
GROUND
BI1(E1)
CN4
PREVIDEO OUT
GROUND
TO
PROCESS BOARD
··· CN3
3
4
5
6

CONDUCTOR VIEW OF MOTHER BOARD


MOTHER BOARD
D
C
B
A
1
2
3
4
5
6
CN13
(TO POWER/SYNC BOARD CN1)
CN7
(TO MICROPROCESSOR BOARD CN1)
CN3
(TO PROCESS BOARD CN1)
CN1
(TO CCD DRIVE BOARD CN1)
ATW VIC-1
CN11
CN10
CN9
CN8
CN14
CN12
(TO POWER/SYNC BOARD CN2)
CN6
(TO MICROPROCESSOR BOARD CN2)
CN2
(TO PROCESS BOARD CN2)
SW1
XTR COMPATIBILITY SW
F1
125V 2A
CN16 (TO AUDIO BOARD CN3)
CN15 (TO LENS CONNECTOR CN4)
CN17
CN18
B
CN3
PAN/TILTE
CONNECTOR
CN11
① PANNING CONT OUT 1
② TILTING CONT OUT 2
③ +4.9V OUT 3
④ GROUND 4
NOT USED 5
TO
AUDIO BOARD
··· CN1
CN10
+12V OUT (10PIN VTR) 1
+12V IN 2
+12V OUT (32PIN) 3
CN5
10 PIN VTR
CONNECTOR
CN9
⑩ +12V IN (10PIN VTR) 1
⑨ GROUND 2
CN8
① VIDEO OUT 1
② GROUND (VIDEO) 2
③ SERIAL DATA IN / OUT 3
④ SERIAL CLOCK IN 4
⑤ AUDIO (R) OUT 5
⑥ REC START/ PAUSE CONT OUT 6
⑦ AUDIO (L) OUT 7
⑧ AUDIO GROUND 8
CN5
1 SC 2 OUT ①
2 GROUND ②
3 SYNC OUT ③
4 SC1 & REC OUT ④
5 COLOR CORRECT IN ⑤
6 EXT CHARACTER IN ⑥
7 GROUND ⑦
8 EXT SC IN ⑧
9 GROUND ⑨
10 +8.6V OUT ⑩
CN2
CHARACTER
GENERATOR
CONNECTOR
CN4
1 EVF VIDEO OUT ①
2 GROUND ②
3 SERIAL CLOCK IN/OUT ③
4 SERIAL DATA IN/OUT ④
5 STANDBY/R CH OUT ⑧
6 EVF CHARACTER OUT ⑥
7 ZEBRA/TALLY/Vp OUT ⑤
8 AUDIO GROUND ⑨
9 GROUND ⑩
10 +12V OUT ⑦
CN1
EVF/CAMERA REMOTE
CONNECTOR
CN17
6 AGC CONT OUT
5 GAIN CONT IN
4 SENSE UP CONT IN
3 IRIS CONT OUT
2 +4.9V OUT
1 GROUND
CN 18
10 +5V OUT
9 AWC START IN
8 AWC/ATW SELECT IN
7 STANDBY IN
CN4
LENS CONNECTOR
COMPONENT SIDE
PATTERN SIDE

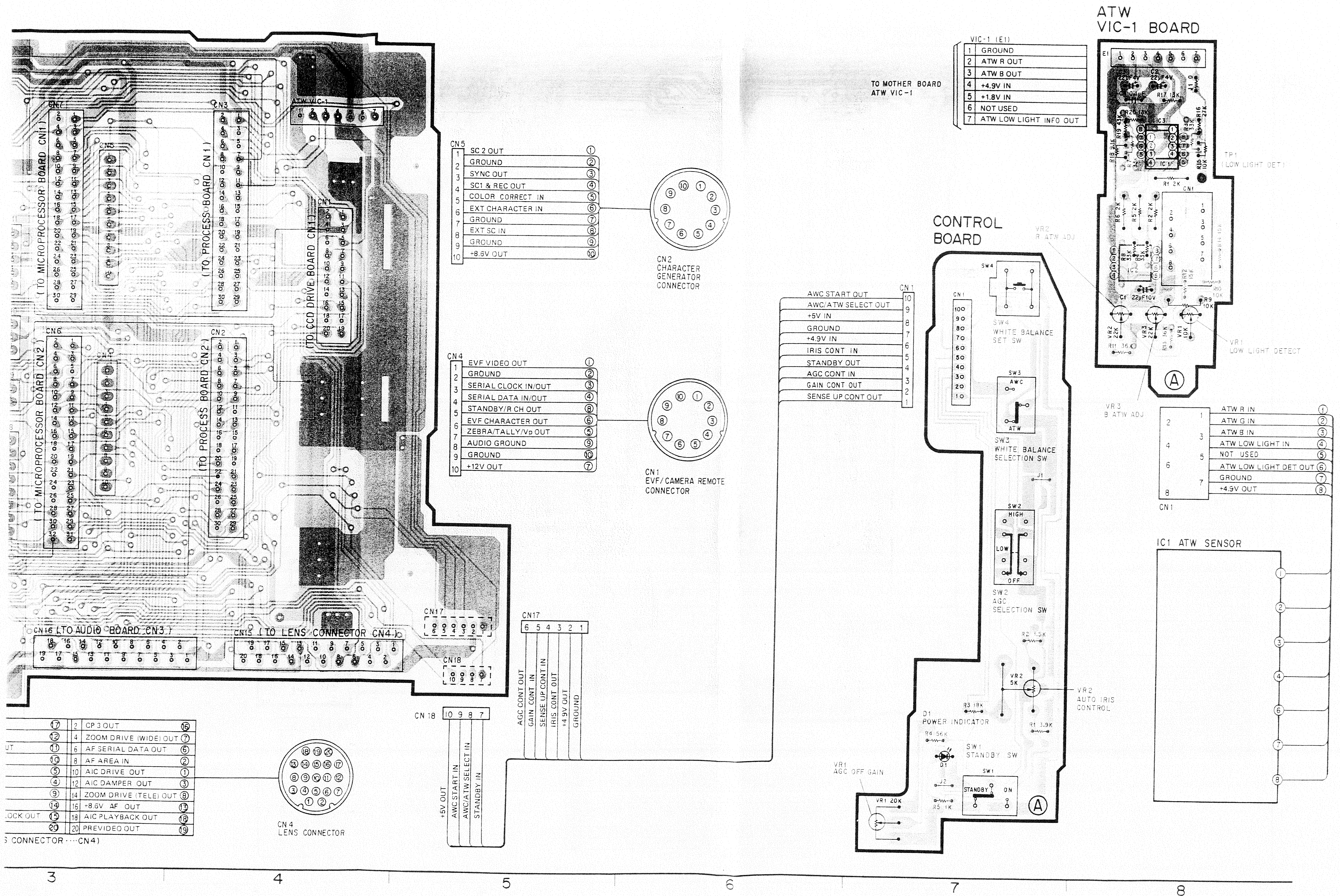
CN14 (32PIN CONNECTOR)

2	CAMERA C/B SELECT IN	1	TEMP INFO IN
4	SC90° SW2 IN	3	SERIAL CLOCK/TALLY OUT
6	SC90° SW1 IN	5	VIDEO OUT
8	EXT/INT+L CH OUT	7	R−Y OUT
10	RCU INFO OUT	9	B−Y OUT
12	C/B SELECT IN / OUT	11	AUDIO GROUND
14	SC B OUT	13	BURST GATE PULSE OUT
16	G/L SYNC IN	15	G/L BSC IN
18	H RESET PULSE IN	17	SERIAL DATA OUT
20	BFP OUT	19	BLK OUT
22	SYNC OUT	21	L/V VIDEO IN
24	TEMP INFO OUT	23	GROUND
26	H PHASE CONT IN	25	GROUND
28	VIDEO OUT/COLOR BAR OUT	27	+12V IN (32PIN)
30	GROUND (VIDEO)	29	+12V IN (32PIN)
32	YH OUT	31	+8.6V OUT

1	CP 2 OUT	⑰	2	CP 3 OUT	⑯
3	HALL IN	⑫	4	ZOOM DRIVE (WIDE) OUT	⑦
5	L/V VIDEO OUT	⑪	6	AF SERIAL DATA OUT	⑥
7	Vp OUT	⑩	8	AF AREA IN	②
9	REC CONT IN	⑤	10	AIC DRIVE OUT	①
11	+1.8 OUT	④	12	AIC DAMPER OUT	③
13	GROUND	⑨	14	ZOOM DRIVE (TELE) OUT	⑧
15	+4.9V OUT	⑭	16	+8.6V AF OUT	⑬
17	AF SERIAL CLOCK OUT	⑮	18	AIC PLAYBACK OUT	⑱
19	GROUND	⑳	20	PREVIDEO OUT	⑲

CN15 (TO LENS CONNECTOR ···· CN4)

CONDUCTOR VIEW OF MOTHER BOARD


CN7
(TO MICROPROCESSOR BOARD CN1)
CN5
CN3
(TO PROCESS BOARD CN1)
ATW VIC-1
CN1
(TO CCD DRIVE BOARD CN1)
CN6
(TO MICROPROCESSOR BOARD CN2)
CN4
CN2
(TO PROCESS BOARD CN2)
CN16 (TO AUDIO BOARD CN3)
CN15 (TO LENS CONNECTOR CN4)
CN17
CN18
CN5
1 SC 2 OUT ①
2 GROUND ②
3 SYNC OUT ③
4 SC1 & REC OUT ④
5 COLOR CORRECT IN ⑤
6 EXT CHARACTER IN ⑥
7 GROUND ⑦
8 EXT SC IN ⑧
9 GROUND ⑨
10 +8.6V OUT ⑩
CN2
CHARACTER
GENERATOR
CONNECTOR
CN4
1 EVF VIDEO OUT ①
2 GROUND ②
3 SERIAL CLOCK IN/OUT ③
4 SERIAL DATA IN/OUT ④
5 STANDBY/R CH OUT ⑧
6 EVF CHARACTER OUT ⑥
7 ZEBRA/TALLY/Vp OUT ⑤
8 AUDIO GROUND ⑨
9 GROUND ⑩
10 +12V OUT ⑦
CN1
EVF/CAMERA REMOTE
CONNECTOR
CN17
6 5 4 3 2 1
AGC CONT OUT
GAIN CONT IN
SENSE UP CONT IN
IRIS CONT OUT
+4.9V OUT
GROUND
CN 18
10 9 8 7
+5V OUT
AWC START IN
AWC/ATW SELECT IN
STANDBY IN
⑰ 2 CP 3 OUT ⑯
⑫ 4 ZOOM DRIVE (WIDE) OUT ⑦
UT ⑪ 6 AF SERIAL DATA OUT ⑥
⑩ 8 AF AREA IN ②
⑤ 10 AIC DRIVE OUT ①
④ 12 AIC DAMPER OUT ③
⑨ 14 ZOOM DRIVE (TELE) OUT ⑧
⑭ 16 +8.6V AF OUT ⑬
OCK OUT ⑮ 18 AIC PLAYBACK OUT ⑱
⑳ 20 PREVIDEO OUT ⑲
S CONNECTOR····CN4)
CN 4
LENS CONNECTOR
TO MOTHER BOARD
ATW VIC-1
VIC-1 (E1)
1 GROUND
2 ATW R OUT
3 ATW B OUT
4 +4.9V IN
5 +1.8V IN
6 NOT USED
7 ATW LOW LIGHT INFO OUT
CONTROL
BOARD
CN1
10 AWC START OUT
9 AWC/ATW SELECT OUT
8 +5V IN
7 GROUND
6 +4.9V IN
5 IRIS CONT IN
4 STANDBY OUT
3 AGC CONT IN
2 GAIN CONT OUT
1 SENSE UP CONT OUT
SW4
SW4
WHITE BALANCE
SET SW
SW3
AWC
ATW
SW3
WHITE BALANCE
SELECTION SW
J1
SW2
HIGH
LOW
OFF
SW2
AGC
SELECTION SW
R2 1.5K
VR2
5K
VR2
AUTO IRIS
CONTROL
R3 18K
D1
POWER INDICATOR
R1 3.9K
R4 56K
D1
SW1
STANDBY SW
SW1
STANDBY
ON
J2
R5 1K
VR1
AGC OFF GAIN
VR1 20K
Ⓐ
ATW
VIC-1 BOARD
E1
1 2 3 4 5 6 7
C3 22μF4V
C2 22μF4V
C4 0.1μF
R17 13K
J1 0
R20 13K
IC3
R19 43K
R16 27K
R3 33K
R18 9.1K
R7 33K
IC1
R15 10K
TP1
(LOW LIGHT DET)
R1 2K
CN1
R6 2K
R5 2K
R2 2K
R14 10K
R8 33K
R4 33K
IC2
R12 15K
R10 10K
C1 22μF10V
R9 10K
VR2
R ATW ADJ
VR2 22K
VR3 22K
R13 36K
VR1 10K
R11 36K
VR1
LOW LIGHT DETECT
Ⓐ
VR3
B ATW ADJ
CN1
1 ATW R IN ①
2 ATW G IN ②
3 ATW B IN ③
4 ATW LOW LIGHT IN ④
5 NOT USED ⑤
6 ATW LOW LIGHT DET OUT ⑥
7 GROUND ⑦
8 +4.9V OUT ⑧
IC1 ATW SENSOR
① ② ③ ④ ⑥ ⑦ ⑧
3
4
5
6
7
8

CONDUCTOR VIEW OF MICROPROCESSOR BOARD

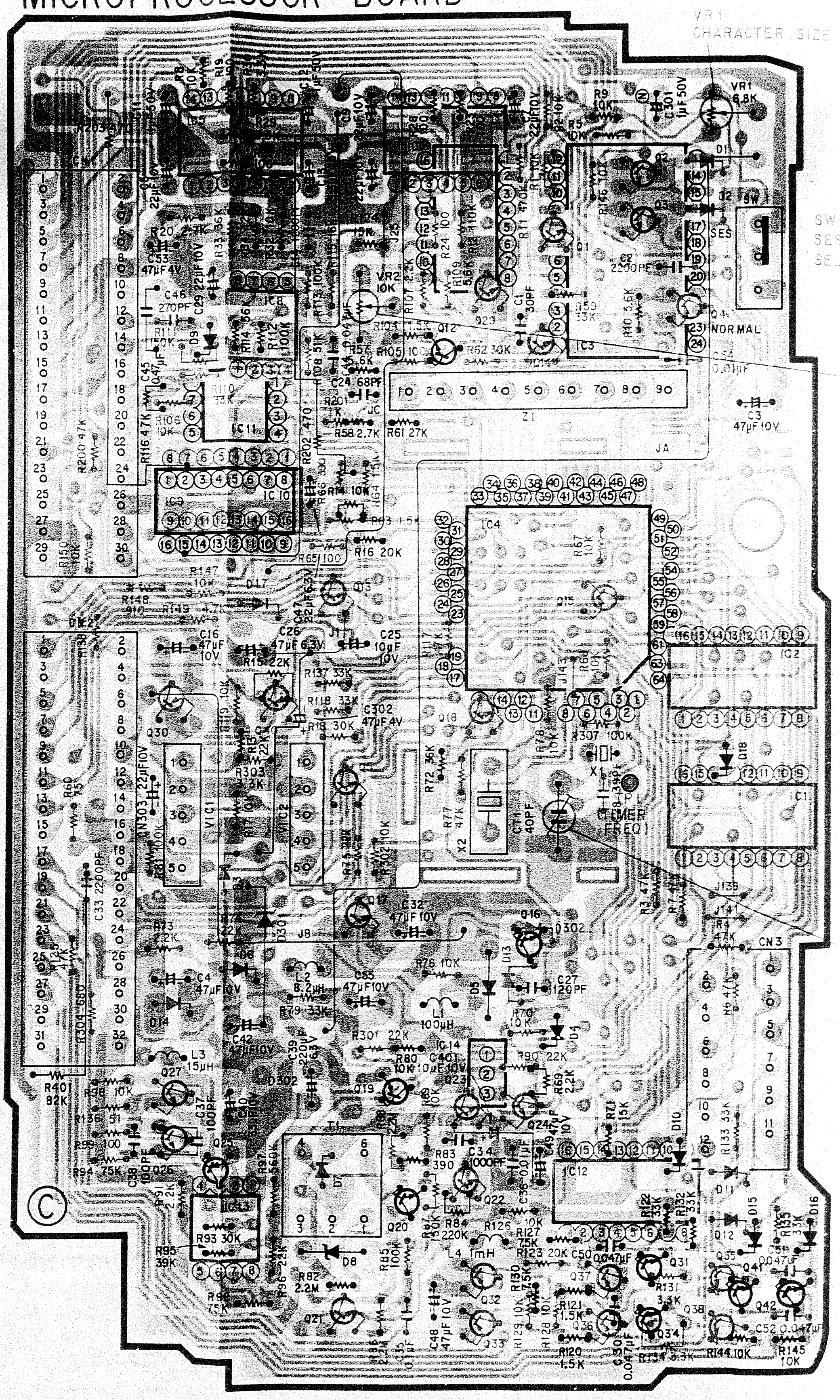
CN1 (TO MOTHER BOARD---CN7)

1	AWC / ATW SELECT IN	2	Vp IN
3	LOW LIGHT INFO IN	4	W. HD IN
5	ATW LOW LIGHT INFO IN	6	CHARACTER OUT
7	MAN B GAIN CONT OUT	8	+1.8V IN
9	MAN R GAIN CONT OUT	10	AIC DRIVE OUT
11	AWC B CONT OUT	12	AIC PLAYBACK IN
13	AWC R CONT OUT	14	AIC DET IN
15	FADE CONT OUT	16	IRIS CONT OUT
17	PEDESTAL CONT OUT	18	AIC DAMPER IN
19	AF AREA IN	20	HALL IN
21	L/V VIDEO IN	22	AWC B IN
23	AWC Y IN	24	AWC R IN
25	B DC CONT IN	26	+4.9V IN
27	GROUND	28	R DC CONT IN
29	+5V IN	30	TILTING CONT OUT

CN 2 (TO MOTHER BOARD---CN6)

1	SES CONT OUT	2	NEG / POS CONT OUT
3	C/B SELECT IN/OUT	4	STANDBY CONT OUT
5	MICON PLAYBACK OUT	6	STANDBY CONT(NEGATIVE) OUT
7	TALLY CONT OUT	8	REC START/PAUSE CONT OUT
9	ZEBRA SELECT OUT	10	SERIAL CLOCK IN/OUT
11	AF SERIAL DATA OUT	12	SERIAL DATA IN/OUT
13	AF SERIAL CLOCK OUT	14	SC 1 IN
15	EVF CHARACTER OUT	16	SC1 & REC OUT
17	PANNING CONT OUT	18	VTR PLAYBACK IN
19	ZOOM DRIVE (WIDE) OUT	20	CAMERA C/B SELECT IN
21	ZOOM DRIVE (TELE) OUT	22	SERIAL CLOCK SW IN
23	RCU INFO IN	24	SERIAL DATA OUT
25	AWC START IN	26	SERIAL CLOCK/TALLY OUT
27	REC CONT IN	28	STANDBY IN
29	GROUND (BATT)	30	+12V IN
31	BACK-UP BATT (+1.5V) IN	32	+8.6V IN

MICROPROCESSOR BOARD


VR1
CHARACTER SIZE
SW
SES
SEL
VR1 6.8K
C301 1μF 50V
R9 10K
D1
D2
SW1
SES
NORMAL
C2 2200PF
C3 47μF 10V
C54 0.01μF
IC1
IC2
IC3
IC4
IC5
IC6
IC8
IC9
IC10
IC11
IC12
IC13
IC14
X1
X2
VR2 10K
L1 100μH
L2 8.2μH
L3 15μH
L4 1mH
CN3
Z1
JA
(CHARACTER FREQ)
C
C
B
A
1
2

- COMPONENT SIDE
- PATTERN SIDE

CONDUCTOR VIEW OF MICROPROCESSOR BOARD

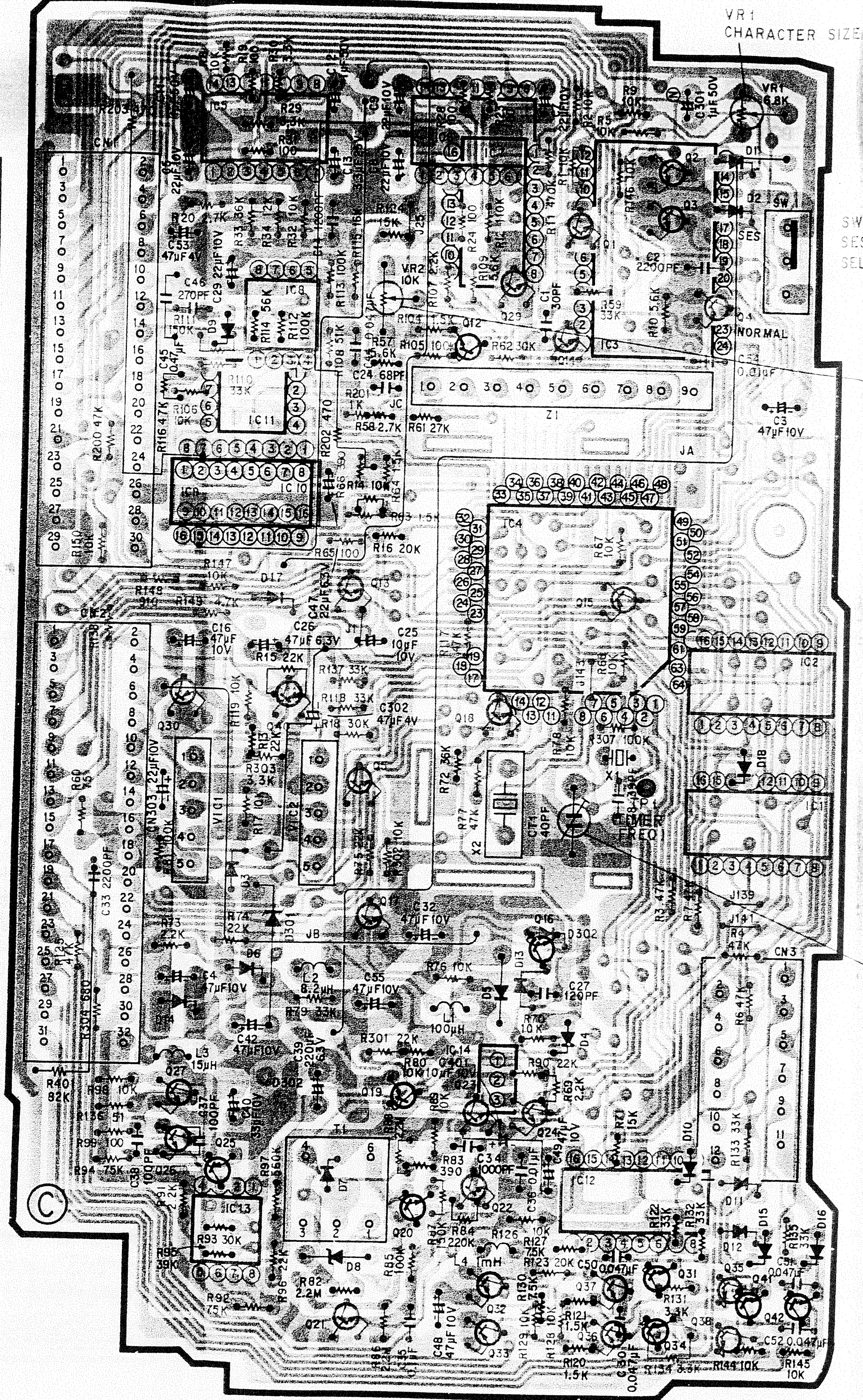
HER BOARD--- CN7)

LECT IN	2	Vp IN
FO IN	4	W. HD IN
HT INFO IN	6	CHARACTER OUT
ONT OUT	8	+1.8V IN
ONT OUT	10	AIC DRIVE OUT
UT	12	AIC PLAYBACK IN
UT	14	AIC DET IN
JT	16	IRIS CONT OUT
NT OUT	18	AIC DAMPER IN
	20	HALL IN
	22	AWC B IN
	24	AWC R IN
	26	+4.9V IN
	28	R DC CONT IN
	30	TILTING CONT OUT

THER BOARD---CN6)

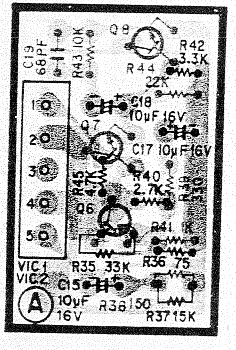
	2	NEG / POS CONT OUT
/OUT	4	STANDBY CONT OUT
CK OUT	6	STANDBY CONT(NEGATIVE) OUT
UT	8	REC START/PAUSE CONT OUT
OUT	10	SERIAL CLOCK IN/OUT
A OUT	12	SERIAL DATA IN/OUT
CK OUT	14	SC 1 IN
R OUT	16	SC1 & REC OUT
OUT	18	VTR PLAYBACK IN
IDE) OUT	20	CAMERA C/B SELECT IN
ELE) OUT	22	SERIAL CLOCK SW IN
	24	SERIAL DATA OUT
	26	SERIAL CLOCK/TALLY OUT
	28	STANDBY IN
)	30	+12V IN
(+1.5V) IN	32	+8.6V IN

MICROPROCESSOR BOARD



VR1
CHARACTER SIZE
SW1
SES/NORMAL
SELECTION SW
VR3
AIC LEVEL
CT1
TIMER FREQ ADJ
SES
NORMAL
IC1
IC2
IC3
IC4
IC5
IC8
IC9
IC10
IC11
IC12
IC13
IC14
VIC1
VIC2
Z1
JA
JB
JC
X1
X2
CN3
CN6
CN7
C

MICROPROCESSOR VIC1/VIC2 BOARD



C19 68PF
R43 10K
Q8
R42 3.3K
R44 22K
C18 10μF 16V
Q7
C17 10μF 16V
R45
R40 2.7K
R39 330
Q6
R41
VIC1
VIC2
R35 33K
R36 75
C15 10μF 16V
R38 150
R37 15K
A

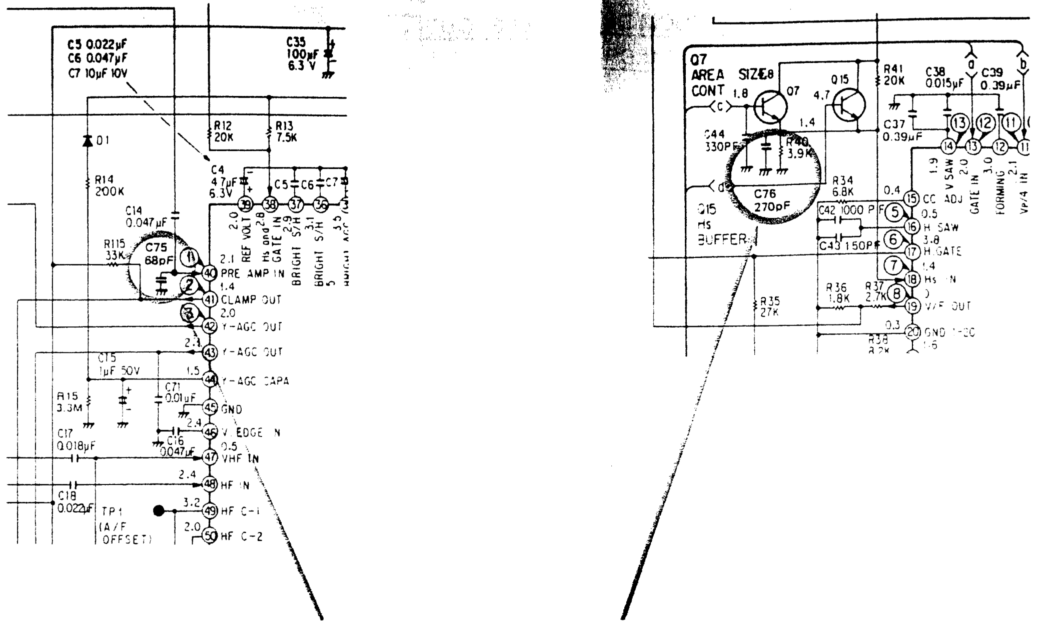
CN3

1	P91
2	+4.9V OUT
3	P 92
4	PA 3
5	P93
6	PA 2
7	ZOOM DRIVE (TELE) IN
8	PA 1
9	ZOOM DRIVE (WIDE) IN
10	PA 0
11	GROUND
12	ZOOM SPEED CONT IN

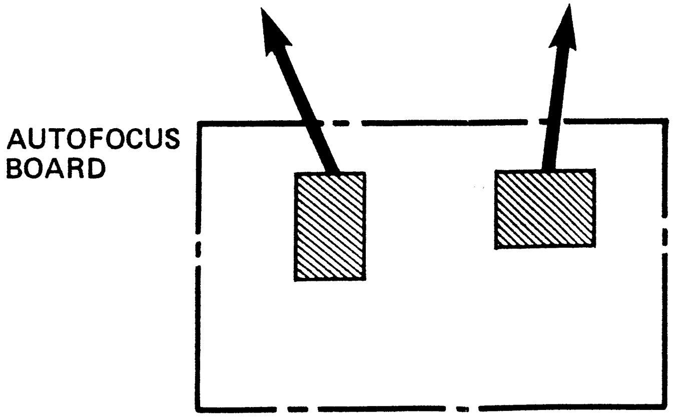
TO GRIP SHOULDER
WV–GR12

—● COMPONENT SIDE
—● PATTERN SIDE

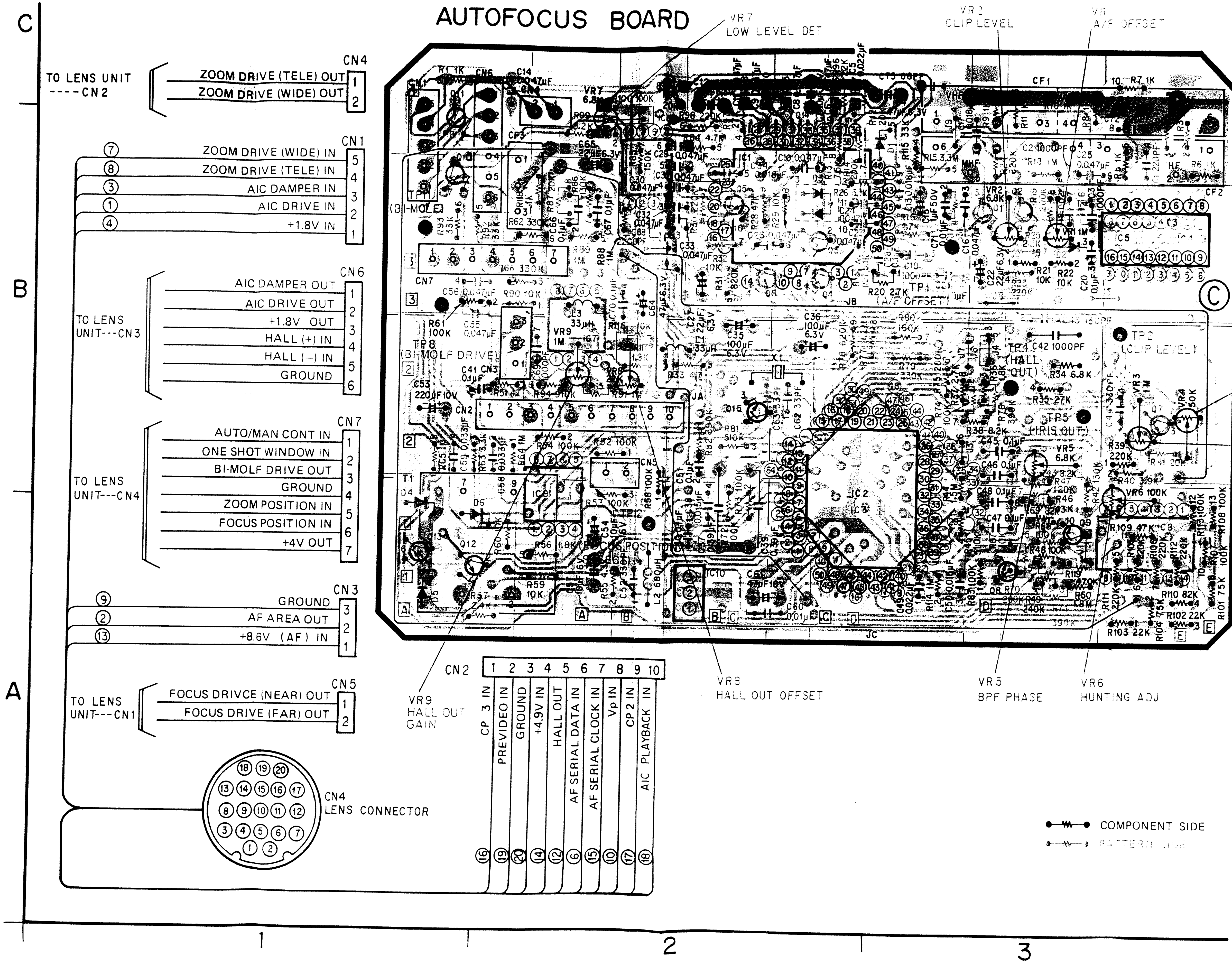
1 2 3


C5 0.022μF
C6 0.047μF
C7 10μF 10V
C35
100μF
6.3 V
R12
20K
R13
7.5K
D1
R14
200K
C4
4.7μF
6.3V
C5
C6
C7
C14
0.047μF
R115
33K
C75
68pF
2.0
REF VOLT
2.8
Hs and GATE IN
2.9
BRIGHT S/H
3.1
BRIGHT S/H
2.1
PRE AMP IN
1.4
CLAMP OUT
2.0
Y-AGC OUT
2.1
Y-AGC OUT
C15
1μF 50V
1.5
Y-AGC CAPA
R15
3.3M
C71
0.01μF
GND
2.4
V EDGE IN
C17
0.018μF
C16
0.047μF
0.5
VHF IN
2.4
HF IN
C18
0.022μF
TP1
(A/F
OFFSET)
3.2
HF C-1
2.0
HF C-2
Q7
AREA SIZE
CONT
1.8
Q7
Q15
4.7
1.4
R41
20K
C38
0.015μF
C39
0.39μF
C44
330PF
R40
3.9K
C37
0.39μF
C76
270pF
R34
6.8K
Q15
Hs
BUFFER
C42 1000 PF
C43 150PF
0.4
CC ADJ
1.9
V SAW
2.0
GATE IN
3.0
FORMING
2.1
Vp/4 IN
0.5
H SAW
3.8
H GATE
1.4
Hs IN
R36
1.8K
R37
2.7K
V/F OUT
R35
27K
0.3
GND
R38

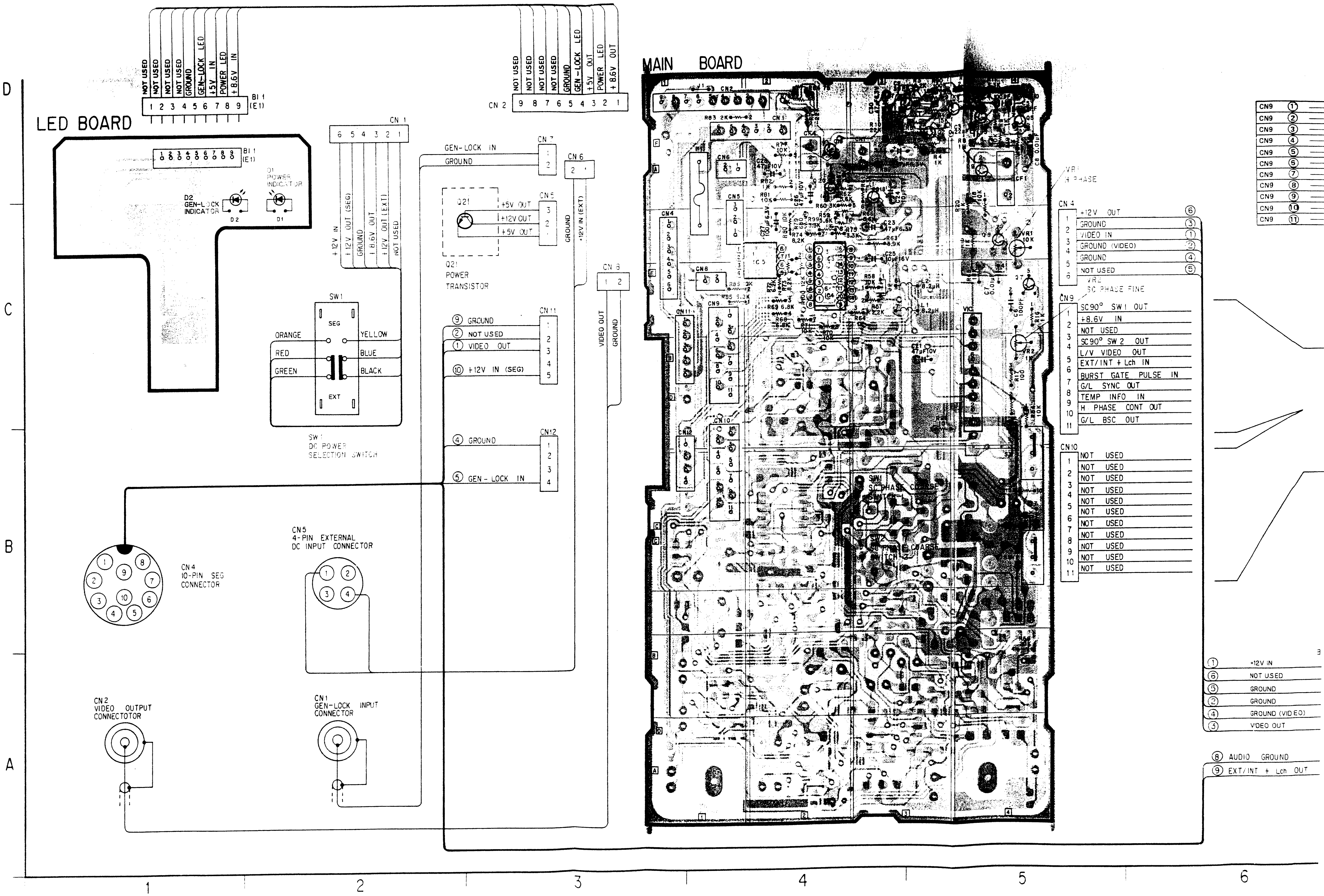
Capacitor C75 and C76 have been added to improve the auto focus.


AUTOFOCUS
BOARD

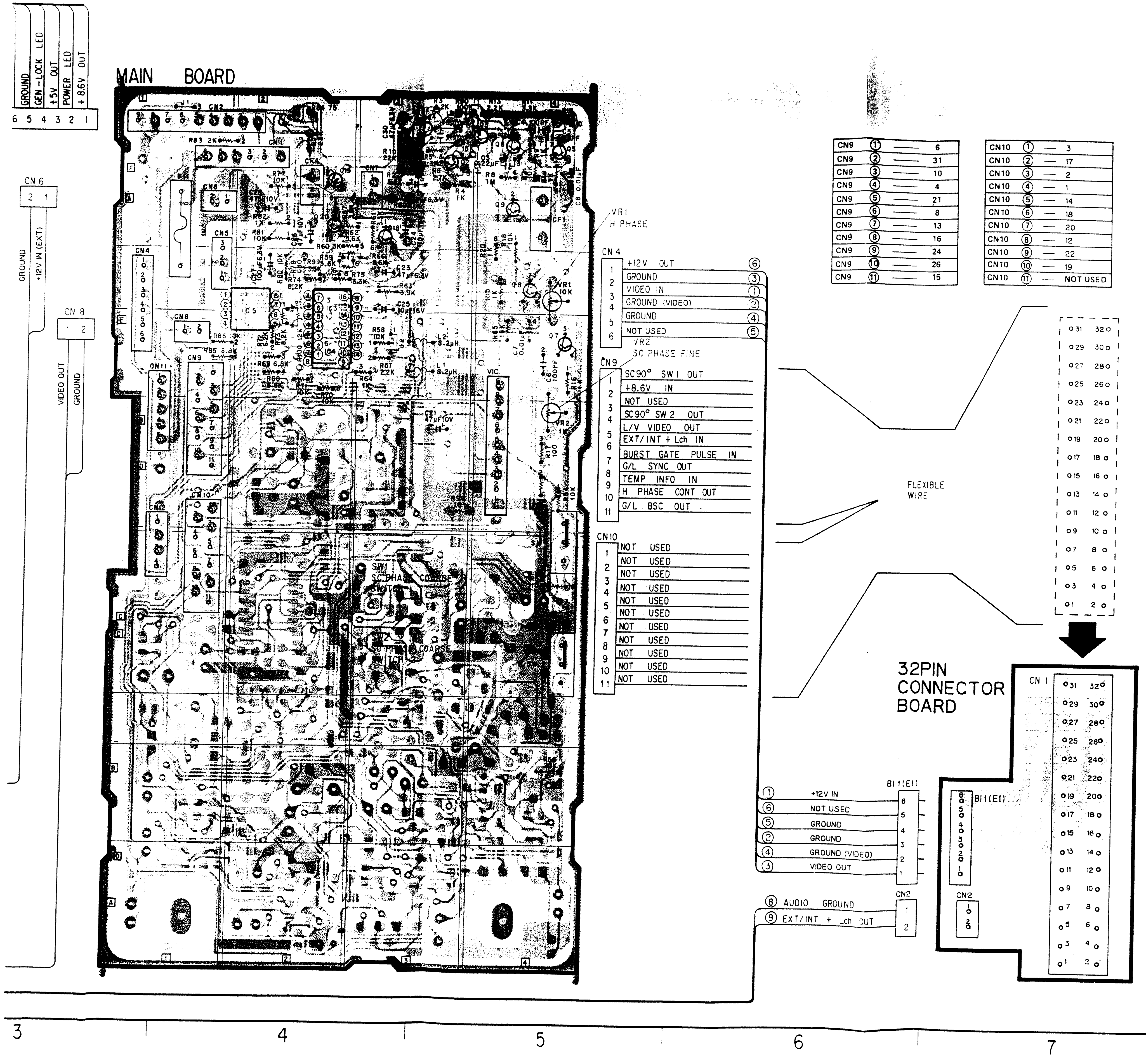
CONDUCTOR VIEW OF AUTOFOCUS BOARD FOR 8X AUTOFOCUS LENS WV-LZ14/8AF


AUTOFOCUS BOARD
C
B
A
1
2
3
TO LENS UNIT ----CN2
CN4
ZOOM DRIVE (TELE) OUT 1
ZOOM DRIVE (WIDE) OUT 2
CN1
⑦ ZOOM DRIVE (WIDE) IN 5
⑧ ZOOM DRIVE (TELE) IN 4
③ AIC DAMPER IN 3
① AIC DRIVE IN 2
④ +1.8V IN 1
CN6
TO LENS UNIT---CN3
AIC DAMPER OUT 1
AIC DRIVE OUT 2
+1.8V OUT 3
HALL (+) IN 4
HALL (−) IN 5
GROUND 6
CN7
TO LENS UNIT---CN4
AUTO/MAN CONT IN 1
ONE SHOT WINDOW IN 2
BI-MOLF DRIVE OUT 3
GROUND 4
ZOOM POSITION IN 5
FOCUS POSITION IN 6
+4V OUT 7
CN3
⑨ GROUND 3
② AF AREA OUT 2
⑬ +8.6V (AF) IN 1
CN5
TO LENS UNIT---CN1
FOCUS DRIVCE (NEAR) OUT 1
FOCUS DRIVE (FAR) OUT 2
⑱ ⑲ ⑳ ⑬ ⑭ ⑮ ⑯ ⑰ ⑧ ⑨ ⑩ ⑪ ⑫ ③ ④ ⑤ ⑥ ⑦ ① ②
CN4 LENS CONNECTOR
CN2
1 CP 3 IN ⑯
2 PREVIDEO IN ⑲
3 GROUND ⑳
4 +4.9V IN ⑭
5 HALL OUT ⑫
6 AF SERIAL DATA IN ⑥
7 AF SERIAL CLOCK IN ⑮
8 Vp IN ⑩
9 CP 2 IN ⑰
10 AIC PLAYBACK IN ⑱
VR7 LOW LEVEL DET
VR2 CLIP LEVEL
VR1 A/F OFFSET
VR4 BI-MOLF GAIN
VR3 BI-MOLF OFFSET
VR8 HALL OUT OFFSET
VR5 BPF PHASE
VR6 HUNTING ADJ
VR9 HALL OUT GAIN
TP1 (A/F OFFSET)
TP2 (CLIP LEVEL)
TP4 (HALL OUT)
TP5 (IRIS OUT)
TP8 (BI-MOLF DRIVE)
TP11 (BI-MOLF)
TP12 (FOCUS POSITION)
CF1
CF2
IC1
IC2
IC5
IC9
IC10
X1
JA
JB
JC
T1
D4
D6
Q12
Q15
L3 33μH
C14 0.047μF
C36 100μF 6.3V
C35 100μF 6.3V
C42 1000PF
C53 220μF 10V
C56 0.047μF
C55 0.047μF
C41 0.1μF
C45 0.1μF
C46 0.1μF
C47 0.1μF
C48 0.1μF
C60 0.01μF
C62 33PF
C70 0.1μF
VR9 1M
VR5 6.8K
VR6 100K
VR2 6.8K
VR3 1M
VR4 50K
R1 1K
R7 1K
R6 1K
R15 3.3M
R20 2.7K
R21 10K
R22 10K
R34 6.8K
R35 27K
R38 8.2K
R39 220K
R40 3.9K
R41 20K
R46 12K
R47 120K
R52 100K
R53 100K
R56 1.8K
R57 2.4K
R59 10K
R60 1.8M
R61 100K
R62 330K
R64 100K
R66 330K
R79 130K
R81 510K
R90 10K
R94 910K
R98 220K
R101 75K
R102 22K
R103 22K
R104 75K
R109 47K
R110 82K
○→W→● COMPONENT SIDE
○→W→○ PATTERN SIDE

CONDUCTOR VIEW OF GEN-LOCK ADAPTOR WV-AD36


LED BOARD
MAIN BOARD
BI 1 (E1)
1 2 3 4 5 6 7 8 9
NOT USED
NOT USED
NOT USED
NOT USED
GROUND
GEN-LOCK LED
+5V IN
POWER LED
+8.6V IN
CN 2
9 8 7 6 5 4 3 2 1
NOT USED
NOT USED
NOT USED
NOT USED
GROUND
GEN-LOCK LED
+5V OUT
POWER LED
+8.6V OUT
D2 GEN-LOCK INDICATOR
D1 POWER INDICATOR
D 2
D1
CN 1
6 5 4 3 2 1
+12V IN
+12V OUT (SEG)
GROUND
+8.6V OUT
+12V OUT (EXT)
NOT USED
SW1
SEG
EXT
ORANGE
RED
GREEN
YELLOW
BLUE
BLACK
SW1 DC POWER SELECTION SWITCH
GEN-LOCK IN
GROUND
CN 7
CN 6
Q21
+5V OUT
+12V OUT
+5V OUT
CN 5
Q21 POWER TRANSISTOR
GROUND
+12V IN (EXT)
CN 8
VIDEO OUT
GROUND
CN 11
⑨ GROUND
② NOT USED
① VIDEO OUT
⑩ +12V IN (SEG)
CN12
④ GROUND
⑤ GEN - LOCK IN
CN4 10-PIN SEG CONNECTOR
CN5 4-PIN EXTERNAL DC INPUT CONNECTOR
CN2 VIDEO OUTPUT CONNECTOTOR
CN1 GEN-LOCK INPUT CONNECTOR
VR1 H PHASE
VR2 SC PHASE FINE
CN 4
1 +12V OUT ⑥
2 GROUND ③
3 VIDEO IN ①
4 GROUND (VIDEO) ②
GROUND ④
5 6 NOT USED ⑤
CN9
1 SC90° SW1 OUT
2 +8.6V IN
NOT USED
3 4 SC90° SW 2 OUT
L/V VIDEO OUT
5 EXT/INT + Lch IN
6 BURST GATE PULSE IN
7 G/L SYNC OUT
8 TEMP INFO IN
9 H PHASE CONT OUT
10 G/L BSC OUT
11
CN10
1-11 NOT USED
CN9 ①
CN9 ②
CN9 ③
CN9 ④
CN9 ⑤
CN9 ⑥
CN9 ⑦
CN9 ⑧
CN9 ⑨
CN9 ⑩
CN9 ⑪
① +12V IN
⑥ NOT USED
⑤ GROUND
② GROUND
④ GROUND (VIDEO)
③ VIDEO OUT
⑧ AUDIO GROUND
⑨ EXT/INT + Lch OUT
D
C
B
A
1
2
3
4
5
6

CONDUCTOR VIEW OF GEN-LOCK ADAPTOR WV-AD36


MAIN BOARD
GROUND
GEN-LOCK LED
+5V OUT
POWER LED
+8.6V OUT
6 5 4 3 2 1
CN 6
2 1
GROUND
+12V IN (EXT)
CN 8
1 2
VIDEO OUT
GROUND
VR1
H PHASE
CN 4
1 +12V OUT ⑥
2 GROUND ③
3 VIDEO IN ①
4 GROUND (VIDEO) ②
5 GROUND ④
6 NOT USED ⑤
VR2
SC PHASE FINE
CN9
1 SC90° SW1 OUT
2 +8.6V IN
3 NOT USED
4 SC90° SW 2 OUT
5 L/V VIDEO OUT
6 EXT/INT + Lch IN
7 BURST GATE PULSE IN
8 G/L SYNC OUT
9 TEMP INFO IN
10 H PHASE CONT OUT
11 G/L BSC OUT
CN10
1 NOT USED
2 NOT USED
3 NOT USED
4 NOT USED
5 NOT USED
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
10 NOT USED
11 NOT USED
FLEXIBLE WIRE
① +12V IN 6
⑥ NOT USED 5
⑤ GROUND 4
② GROUND 3
④ GROUND (VIDEO) 2
③ VIDEO OUT 1
B11(E1)
⑧ AUDIO GROUND 1
⑨ EXT/INT + Lch OUT 2
CN2
32PIN CONNECTOR BOARD
CN 1
31 32
29 30
27 28
25 26
23 24
21 22
19 20
17 18
15 16
13 14
11 12
9 10
7 8
5 6
3 4
1 2
CN4
CN5
CN8
CN9
CN10
CN11
CN12
IC5
IC4
SW1 SC PHASE COARSE
SW2
VIC
3
4
5
6
7

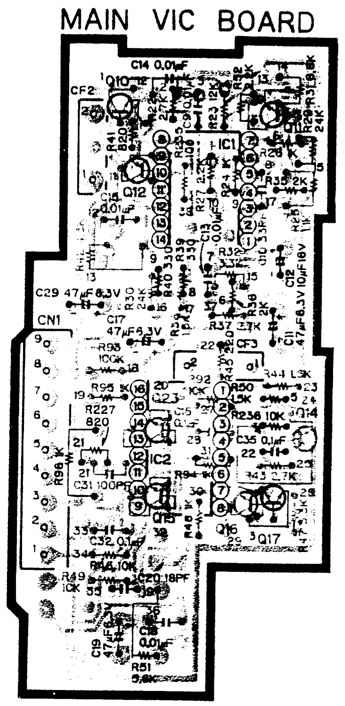
CN9	①	——	6
CN9	②	——	31
CN9	③	——	10
CN9	④	——	4
CN9	⑤	——	21
CN9	⑥	——	8
CN9	⑦	——	13
CN9	⑧	——	16
CN9	⑨	——	24
CN9	⑩	——	26
CN9	⑪	——	15

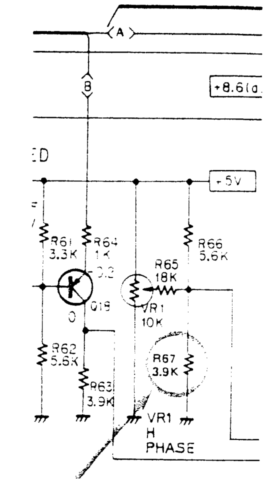
CN10	①	—	3
CN10	②	—	17
CN10	③	—	2
CN10	④	—	1
CN10	⑤	—	14
CN10	⑥	—	18
CN10	⑦	—	20
CN10	⑧	—	12
CN10	⑨	—	22
CN10	⑩	—	19
CN10	⑪	—	NOT USED

CN 1 (TO MOTHER BOARD---CN14)

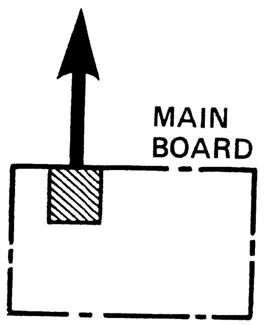
1	TEMP INFO OUT	2	CAMERA C/B SELECT OUT
3	SERIAL CLOCK/TALLY IN	4	SC90° SW2 OUT
5	VIDEO IN	6	SC90° SW1 OUT
7	NOT USED	8	EXT/INT + L CH IN
9	NOT USED	10	RCU INFO OUT
11	AUDIO GROUD	12	C/B SELECT IN/OUT
13	BURST GATE PULSE IN	14	SC IN
15	G/L BSC OUT	16	G/L SYNC OUT
17	SERIAL DATA IN	18	H RESET PULSE OUT
19	BLK IN	20	BFP IN
21	L/V VIDEO OUT	22	SYNC IN
23	GROUND	24	TEMP INFO IN
25	GROUND	26	H PHASE CONT OUT
27	+12V OUT (32PIN)	28	VIDEO IN/OUT COLOR BAR IN
29	NOT USED	30	GROUND (VIDEO)
31	+8.6V IN	32	NOT USED

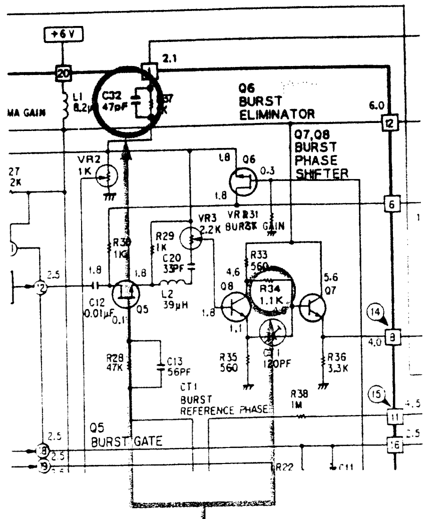
⊷ COMPONENT SIDE
⊷ PATTERN SIDE


MAIN VIC BOARD
C14 0.01μF
CF2
IC1
IC2
CN1
C29 47μF6.3V
Q12
Q13
Q14
Q17
R67 3.9K
R227 820
R49 10K
R51

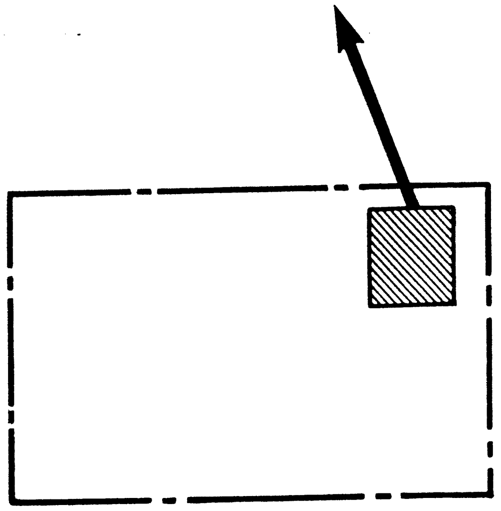

A
B
+8.6(a
ED
+5V
R61 3.3K
R64 1K
Q19
R65 18K
R66 5.6K
VR1 10K
R62 5.6K
R63 3.9K
R67 3.9K
VR1 H PHASE

Resistor R67 has been changed to improve the H phase signal from 4.3k ohms to 3.9k ohms.

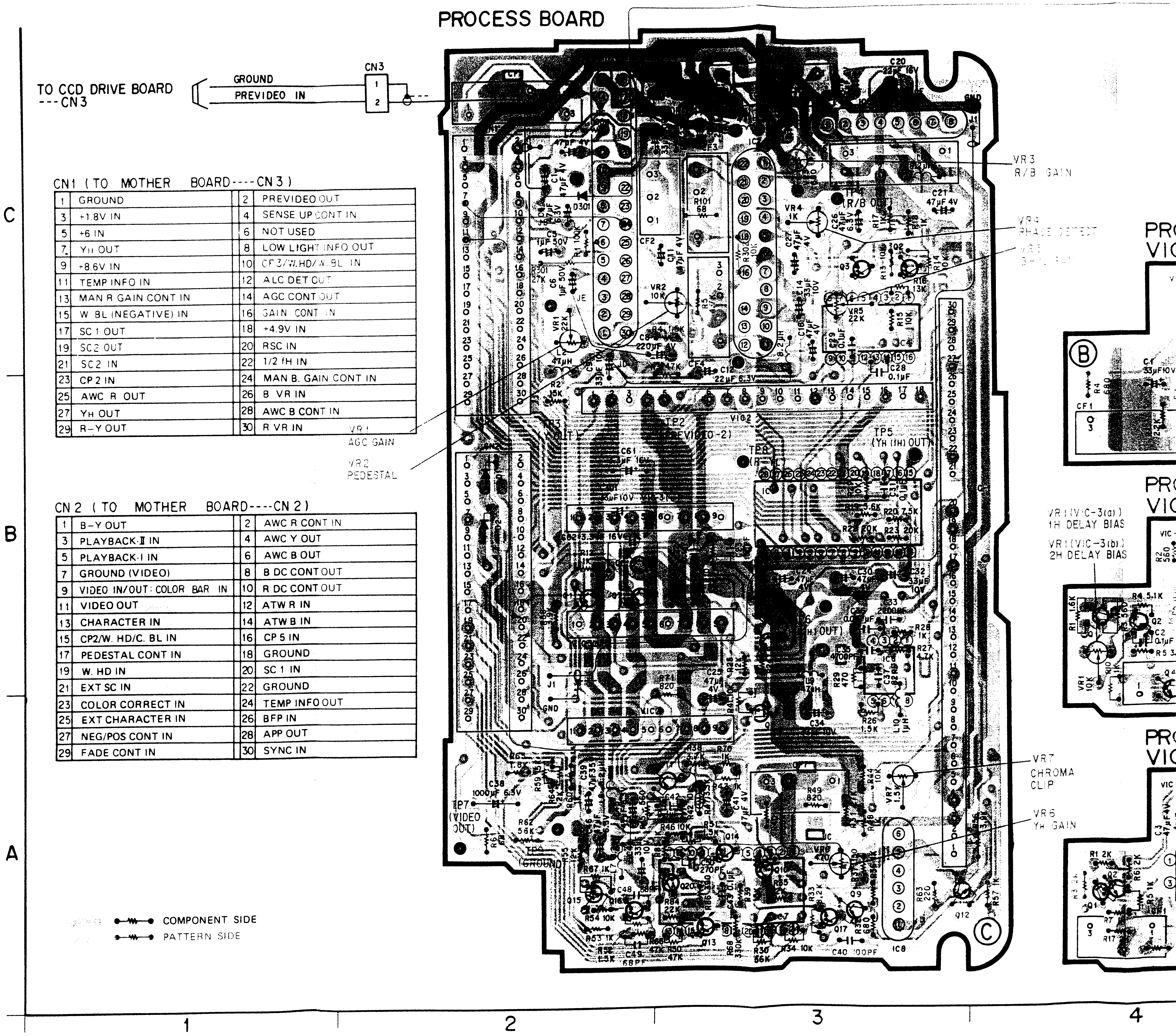



+6V
Q6
BURST
ELIMINATOR
Q7,Q8
BURST
PHASE
SHIFTER
C32
47pF
L1
8.2μ
MA GAIN
VR2
1K
VR3
2.2K
VR31
BURST GAIN
R29
1K
C20
33PF
L2
39μH
R33
560
R34
1.1K
C12
0.01μF
R28
47K
C13
56PF
CT1
BURST
REFERENCE PHASE
R35
560
C11
120PF
R36
3.3K
R38
1M
Q5
BURST GATE
R22

Capacitor C32 has been added and resistor R34 has been changed to shifting the adjusting range of the burst phase from 1.8k ohms to 1.1k ohms.



CONDUCTOR VIEW OF PROCESS BOA


PROCESS BOARD
TO CCD DRIVE BOARD
---CN3
GROUND
PREVIDEO IN
CN3
1
2
VR3
R/B GAIN
VR4
PHASE DETECT
VR5
B-Y
VR1
AGC GAIN
VR2
PEDESTAL
TP2
(VIC-2)
TP5
(YH (1H) OUT)
TP7
(VIDEO
OUT)
TP4
(GROUND)
VR7
CHROMA
CLIP
VR6
YH GAIN
VR1 (VIC-3(a))
1H DELAY BIAS
VR1 (VIC-3(b))
2H DELAY BIAS
B
C
COMPONENT SIDE
PATTERN SIDE
C
B
A
1
2
3
4

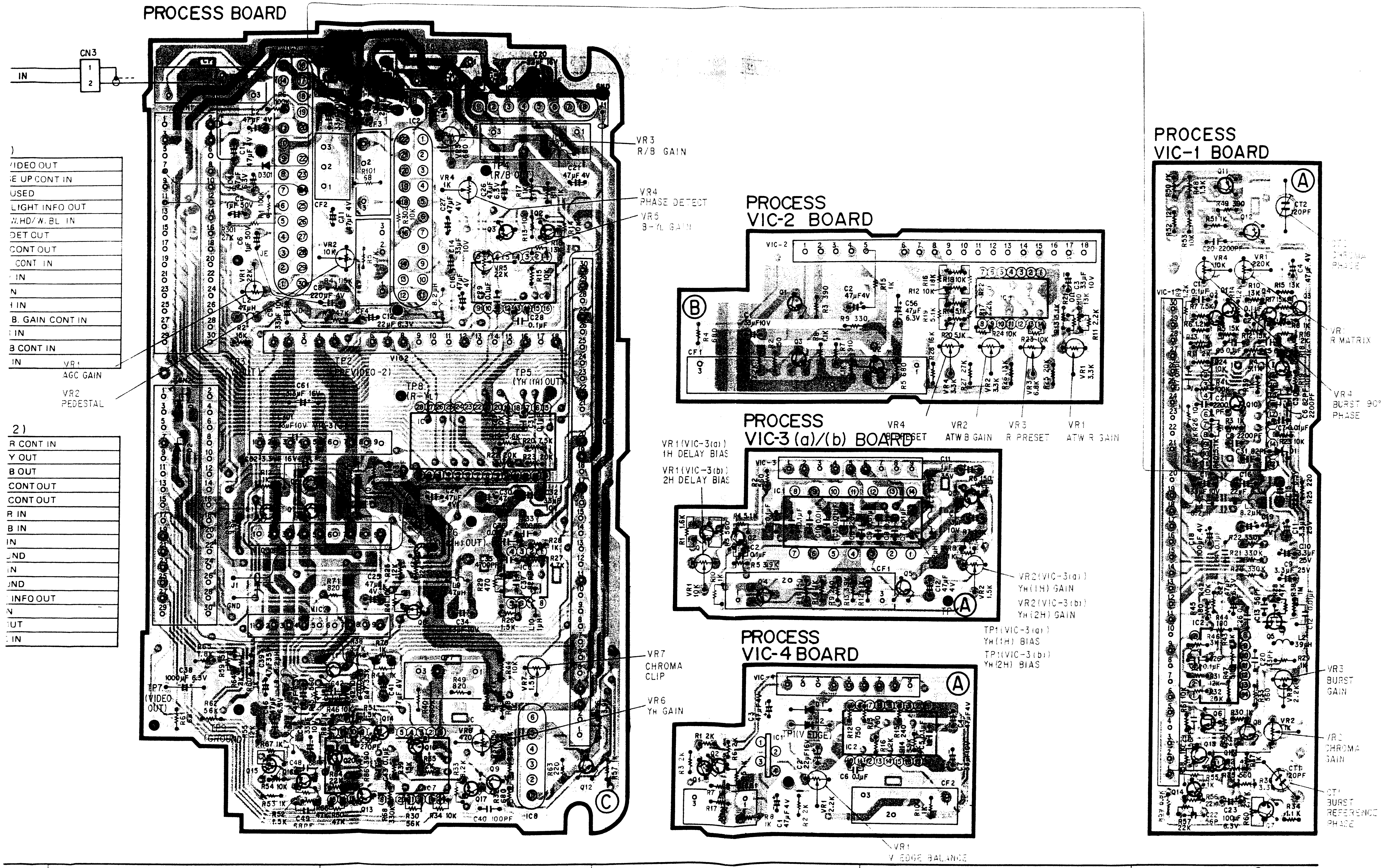
CN1 (TO MOTHER BOARD----CN 3)

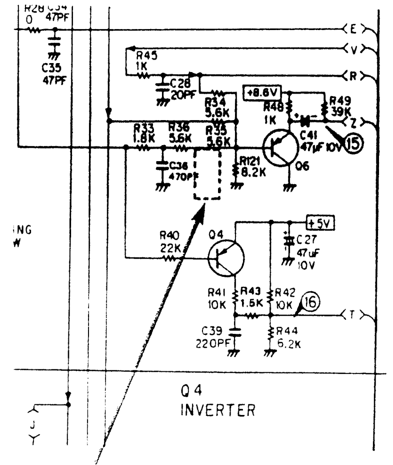
1	GROUND	2	PREVIDEO OUT
3	+1.8V IN	4	SENSE UP CONT IN
5	+6 IN	6	NOT USED
7	YH OUT	8	LOW LIGHT INFO OUT
9	+8.6V IN	10	CP3/W.HD/W.BL IN
11	TEMP INFO IN	12	ALC DET OUT
13	MAN R GAIN CONT IN	14	AGC CONT OUT
15	W BL (NEGATIVE) IN	16	GAIN CONT IN
17	SC 1 OUT	18	+4.9V IN
19	SC2 OUT	20	RSC IN
21	SC2 IN	22	1/2 fH IN
23	CP 2 IN	24	MAN B. GAIN CONT IN
25	AWC R OUT	26	B VR IN
27	YH OUT	28	AWC B CONT IN
29	R–Y OUT	30	R VR IN

CN 2 (TO MOTHER BOARD----CN 2)

1	B–Y OUT	2	AWC R CONT IN
3	PLAYBACK-II IN	4	AWC Y OUT
5	PLAYBACK-I IN	6	AWC B OUT
7	GROUND (VIDEO)	8	B DC CONT OUT
9	VIDEO IN/OUT: COLOR BAR IN	10	R DC CONT OUT
11	VIDEO OUT	12	ATW R IN
13	CHARACTER IN	14	ATW B IN
15	CP2/W. HD/C. BL IN	16	CP 5 IN
17	PEDESTAL CONT IN	18	GROUND
19	W. HD IN	20	SC 1 IN
21	EXT SC IN	22	GROUND
23	COLOR CORRECT IN	24	TEMP INFO OUT
25	EXT CHARACTER IN	26	BFP IN
27	NEG/POS CONT IN	28	APP OUT
29	FADE CONT IN	30	SYNC IN

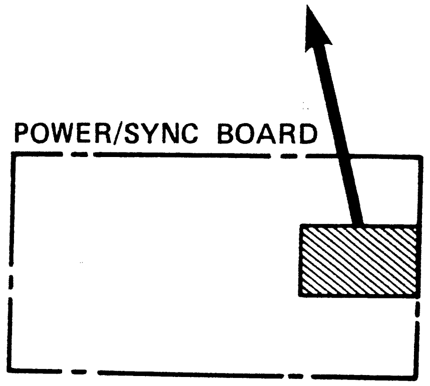
CONDUCTOR VIEW OF PROCESS BOARD


PROCESS BOARD
CN3
IN
)
VIDEO OUT
E UP CONT IN
USED
LIGHT INFO OUT
W.HD/W.BL IN
DET OUT
CONT OUT
CONT IN
IN
N
IN
B. GAIN CONT IN
IN
B CONT IN
IN
2)
R CONT IN
Y OUT
B OUT
CONT OUT
CONT OUT
R IN
B IN
IN
ND
IN
ND
INFO OUT
N
UT
IN
VR1 AGC GAIN
VR2 PEDESTAL
VR3 R/B GAIN
VR4 PHASE DETECT
VR5 B-Y GAIN
VR7 CHROMA CLIP
VR6 YH GAIN
TP7 (VIDEO OUT)
TP9 (GROUND)
PROCESS VIC-2 BOARD
VR4 B PRESET
VR2 ATW B GAIN
VR3 R PRESET
VR1 ATW R GAIN
PROCESS VIC-3 (a)/(b) BOARD
VR1 (VIC-3(a)) 1H DELAY BIAS
VR1 (VIC-3(b)) 2H DELAY BIAS
VR2 (VIC-3(a)) YH(1H) GAIN
VR2 (VIC-3(b)) YH(2H) GAIN
TP1 (VIC-3(a)) YH(1H) BIAS
TP1 (VIC-3(b)) YH(2H) BIAS
PROCESS VIC-4 BOARD
VR1 V EDGE BALANCE
PROCESS VIC-1 BOARD
CT2 CHROMA PHASE
VR1 R MATRIX
VR4 BURST 90° PHASE
VR3 BURST GAIN
VR2 CHROMA GAIN
CT1 BURST REFERENCE PHASE
2
3
4
5
6


R28 C34 0 47PF
C35 47PF
R45 1K
C28 20PF
R34 5.6K
+8.6V
R48 1K
R49 39K
C41 47µF 10V
R33 1.8K
R36 5.6K
R35 5.6K
C36 470P
R121 8.2K
Q6
+5V
C27 47µF 10V
R40 22K
Q4
R41 10K
R43 1.5K
R42 10K
C39 220PF
R44 6.2K
Q4
INVERTER
ING
E
V
R
Z
T
15
16

Capacitor C37 has been removed to improve the pedestal signal.

POWER/SYNC BOARD



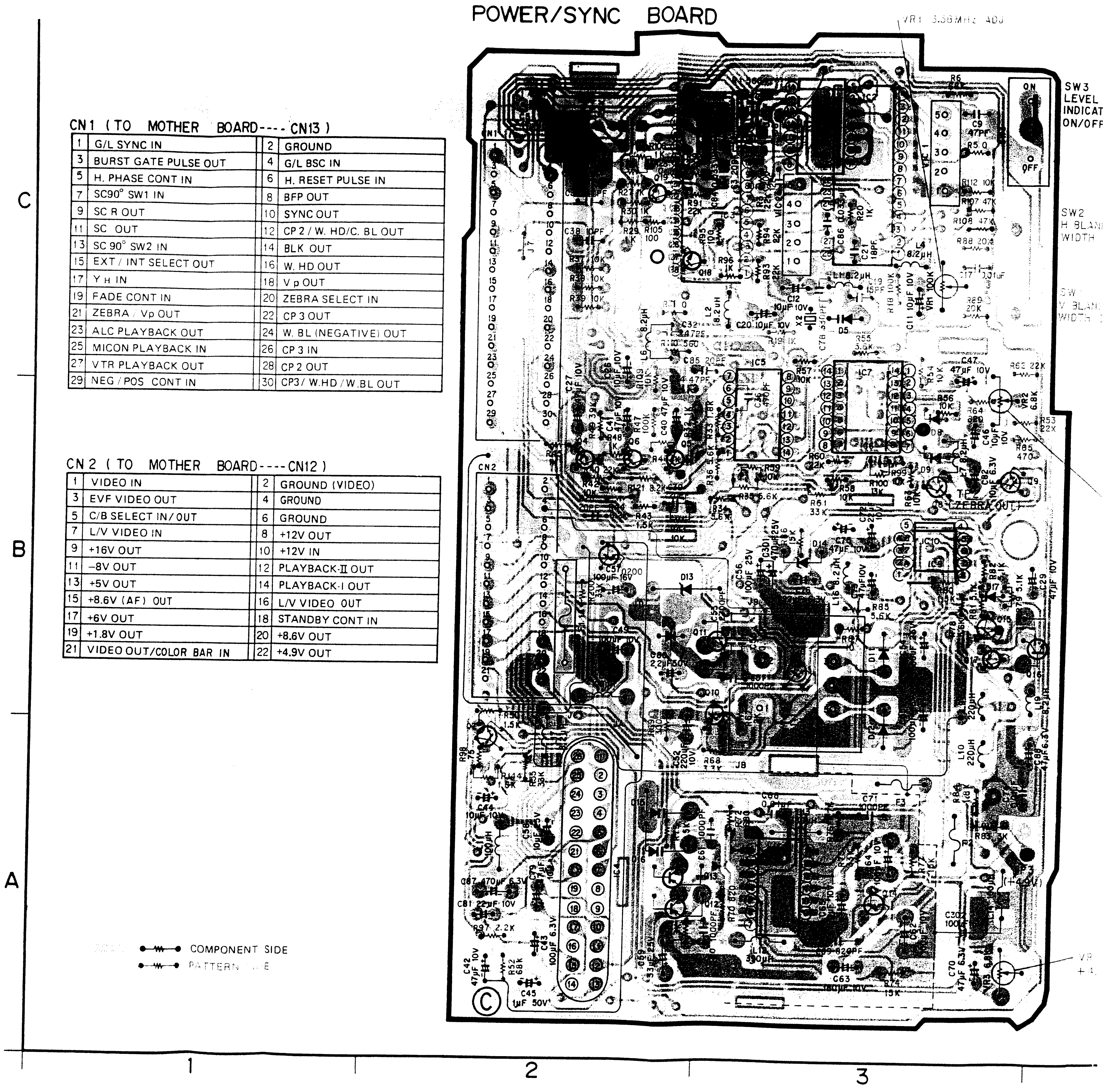
CONDUCTOR VIEW OF POWER/SYNC BOARD

CN1 (TO MOTHER BOARD----CN13)

1	G/L SYNC IN	2	GROUND
3	BURST GATE PULSE OUT	4	G/L BSC IN
5	H. PHASE CONT IN	6	H. RESET PULSE IN
7	SC90° SW1 IN	8	BFP OUT
9	SC R OUT	10	SYNC OUT
11	SC OUT	12	CP 2 / W. HD/C. BL OUT
13	SC 90° SW2 IN	14	BLK OUT
15	EXT / INT SELECT OUT	16	W. HD OUT
17	Y H IN	18	V p OUT
19	FADE CONT IN	20	ZEBRA SELECT IN
21	ZEBRA / Vp OUT	22	CP 3 OUT
23	ALC PLAYBACK OUT	24	W. BL (NEGATIVE) OUT
25	MICON PLAYBACK IN	26	CP 3 IN
27	VTR PLAYBACK OUT	28	CP 2 OUT
29	NEG / POS CONT IN	30	CP3/ W.HD / W.BL OUT

CN2 (TO MOTHER BOARD----CN12)

1	VIDEO IN	2	GROUND (VIDEO)
3	EVF VIDEO OUT	4	GROUND
5	C/B SELECT IN/OUT	6	GROUND
7	L/V VIDEO IN	8	+12V OUT
9	+16V OUT	10	+12V IN
11	-8V OUT	12	PLAYBACK-II OUT
13	+5V OUT	14	PLAYBACK-I OUT
15	+8.6V (AF) OUT	16	L/V VIDEO OUT
17	+6V OUT	18	STANDBY CONT IN
19	+1.8V OUT	20	+8.6V OUT
21	VIDEO OUT/COLOR BAR IN	22	+4.9V OUT


POWER/SYNC BOARD
VR1 3.58MHz ADJ
SW3 LEVEL INDICAT ON/OFF
SW2 H BLAN WIDTH
SW1 V BLAN WIDTH
ON
OFF
CN1
CN2
IC1
IC2
IC5
IC7
IC10
ZEBRA OUT
C
B
A
1
2
3

●—w—● COMPONENT SIDE

●—w—● PATTERN SIDE

CONDUCTOR VIEW OF POWER/SYNC BOARD

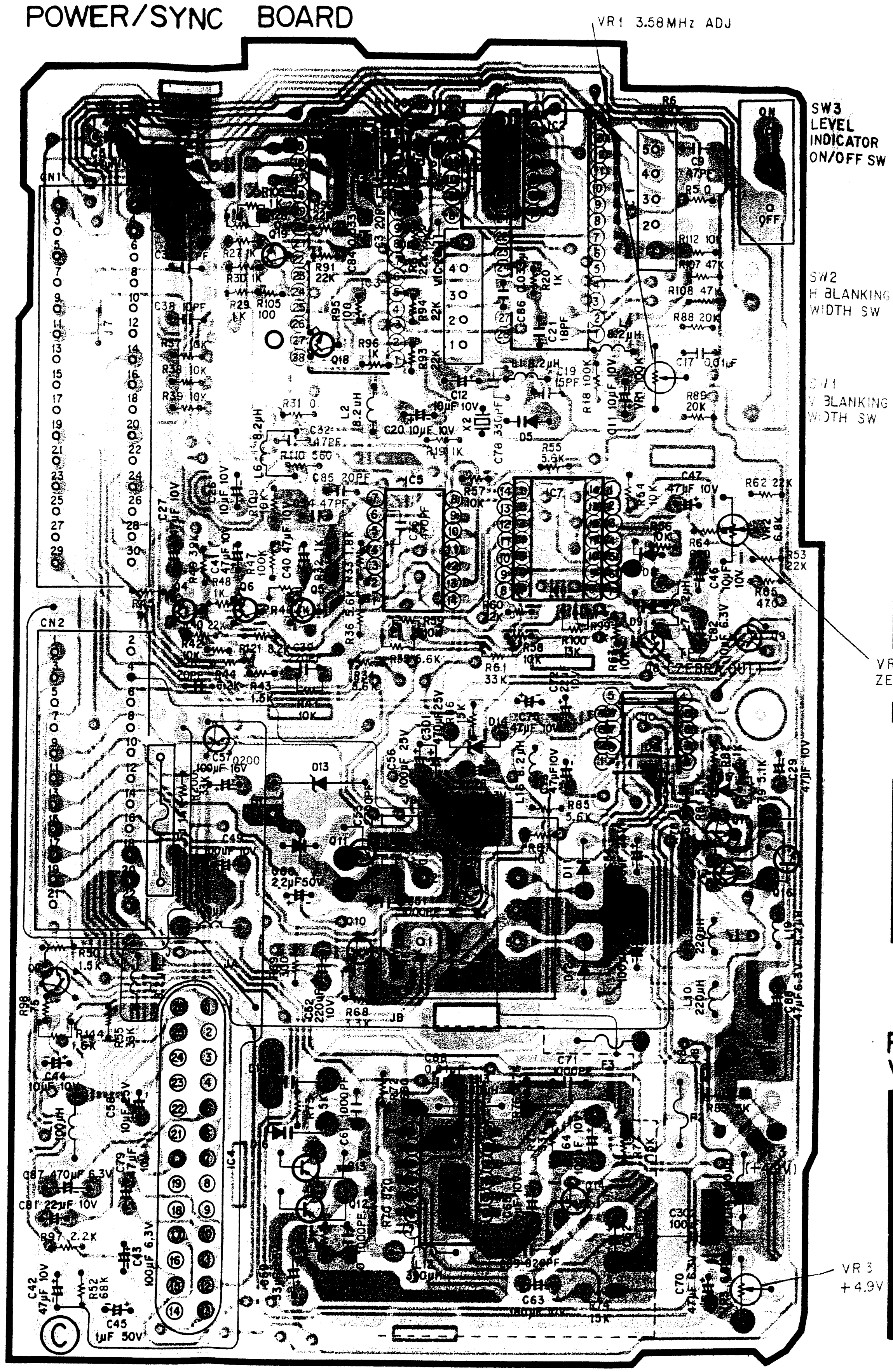
ER BOARD---- CN13)

	2	GROUND
LSE OUT	4	G/L BSC IN
IN	6	H. RESET PULSE IN
	8	BFP OUT
	10	SYNC OUT
	12	CP 2 / W. HD/C. BL OUT
	14	BLK OUT
T OUT	16	W. HD OUT
	18	V p OUT
	20	ZEBRA SELECT IN
	22	CP 3 OUT
OUT	24	W. BL (NEGATIVE) OUT
K IN	26	CP 3 IN
OUT	28	CP 2 OUT
IN	30	CP3/ W.HD / W.BL OUT

HER BOARD----CN12)

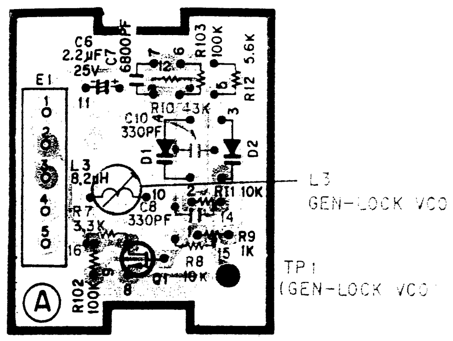
	2	GROUND (VIDEO)
	4	GROUND
OUT	6	GROUND
	8	+12V OUT
	10	+12V IN
	12	PLAYBACK-II OUT
	14	PLAYBACK-I OUT
	16	L/V VIDEO OUT
	18	STANDBY CONT IN
	20	+8.6V OUT
OR BAR IN	22	+4.9V OUT

POWER/SYNC BOARD

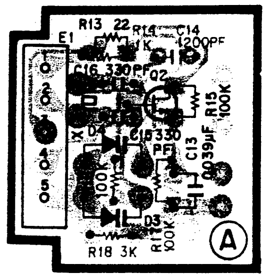

VR1 3.58MHz ADJ
SW3 LEVEL INDICATOR ON/OFF SW
ON
OFF
SW2 H BLANKING WIDTH SW
SW1 V BLANKING WIDTH SW
VR2 ZEBRA LEVEL
VR3 +4.9V ADJ
CN1
CN2
ZEBRA OUT
C

- COMPONENT SIDE
- PATTERN SIDE

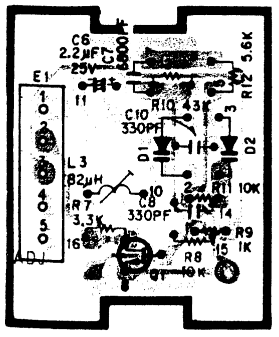
POWER/SYNC VIC-1 BOARD


E1
L3 GEN-LOCK VCO
TP1 (GEN-LOCK VCO)
A

POWER/SYNC VIC-2 BOARD



POWER/SYNC VIC-3 BOARD



1 2 3 4 5

REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by "o" mark are new parts used from this model.

SYMBOL NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
COLOUR VIDEO CAMERA WVP-F10			
MICROPROCESSOR BOARD			
R111	YF2116154JT	YF2116104JT	Carbon 100k ohms 1/16W
R401	ERD10TJ823	YF2116823JT	Carbon 82k ohms 1/16W
CCD DRIVE BOARD			
C26	—	YF400100CHDT	Ceramic 10pF
CCD BOARD			
R17	YF2116514GT	YF2116103GT	Carbon 10k ohms 1/16W
R18	YF2116514GT	YF2116104GT	Carbon 100k ohms 1/16W
R20	YF2116332JT	YF2116562JT	Carbon 5.6k ohms 1/16W
PROCESS VIC-1 BOARD			
R34	YF2116182JT	YF2116112JT	Carbon 1.1k ohms 1/16W
C32	—	ECCF1H470JC	Ceramic 47pF 50V
AUTOFOCUS UNIT WV-LZ14/8AF			
AUTOFOCUS BOARD			
R17	—	YF2116333JT	Carbon 33k ohms 1/16W
C75	—	YF400680CHJT	Ceramic 68pF
C76	—	ECKF1H271KB	Ceramic 270pF 50V
GEN-LOCK ADAPTOR WV-AD36			
MAIN BOARD			
R67	YF2116432JT	YF2116392JT	Carbon 3.9k ohms 1/16W

V10-55 [illegible]

ORDER NO. VKD86111031S8

Service Manual

Supplement-2

System Camera
WVP-F10

1" Electronic Viewfinder
WV-VF01

Gen-lock Adaptor
WV-AD36

8X Auto Focus Lens
WV-LZ14/8AF

Grip Shoulder
WV-GR12

12X Power Zoom Lens
WV-LZ14/12

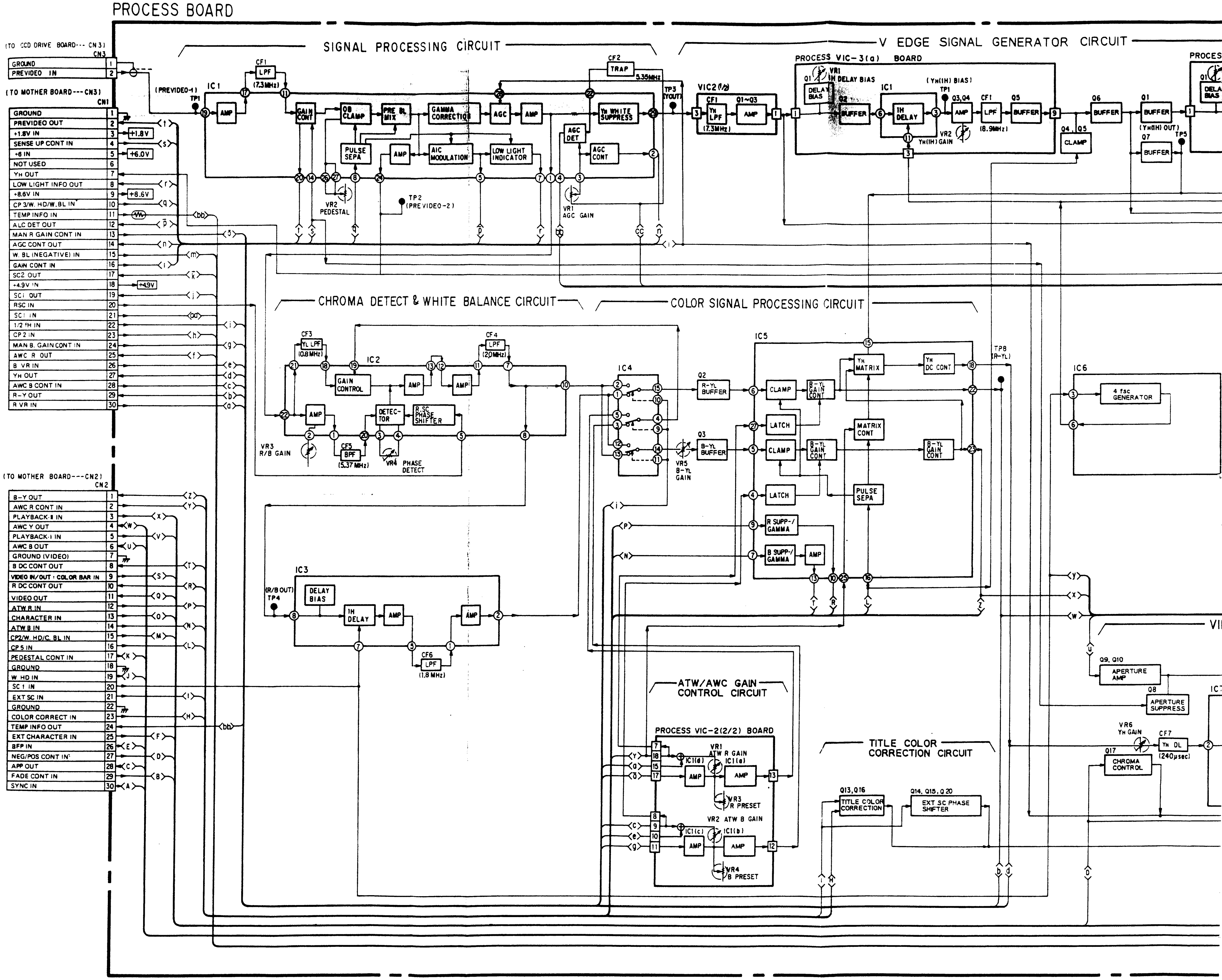
- Please file this supplement service manual with the service manual Order No. VKD86101016C1.

- Due to shifting the color reproduction slightly, the adjustment procedure of (22) Burst and Chroma adjustment has been changed.

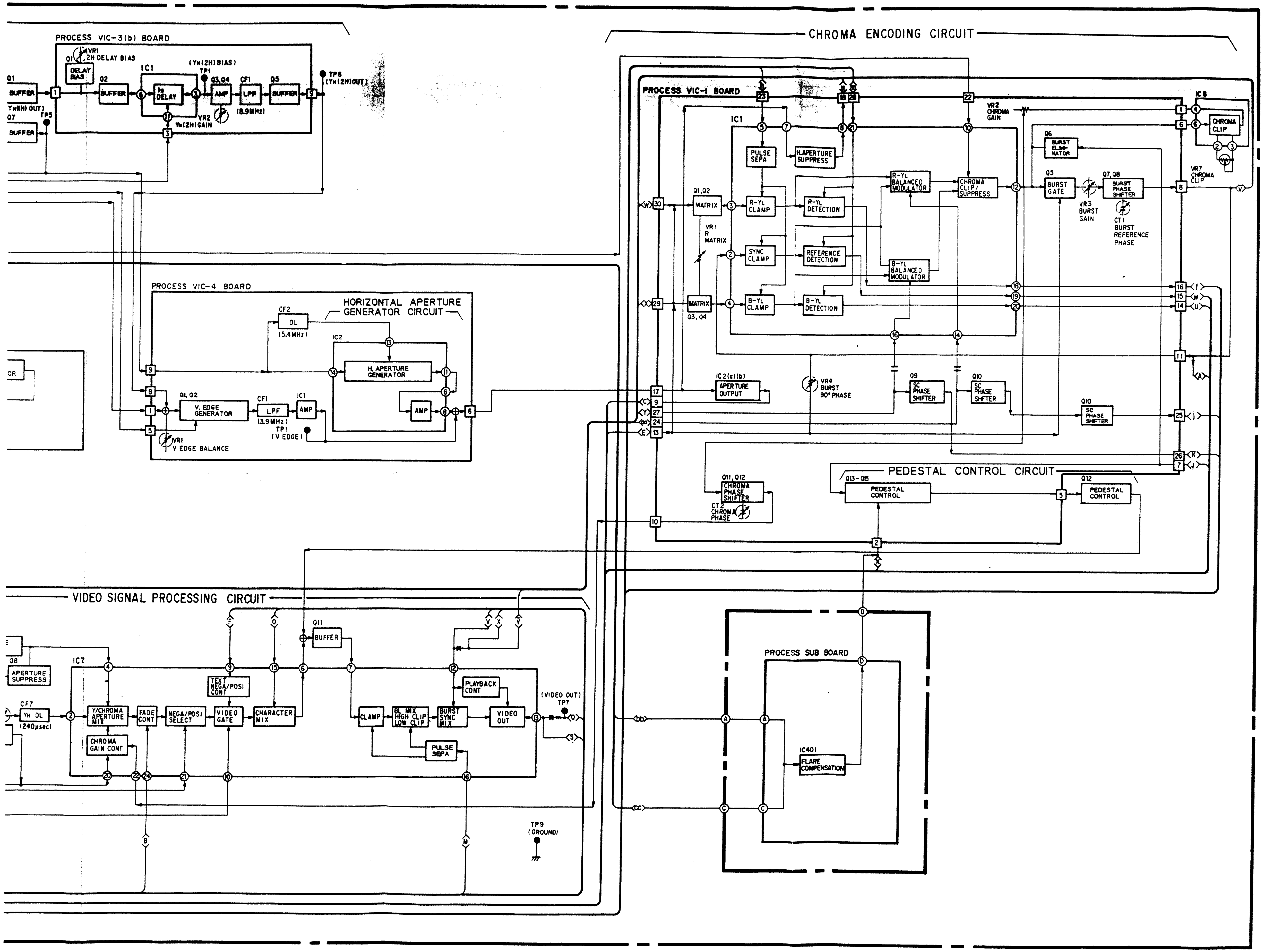
National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

BLOCK DIAGRAM OF


PROCESS BOARD
(TO CCD DRIVE BOARD--- CN3)
CN3
GROUND 1
PREVIDEO IN 2
(TO MOTHER BOARD---CN3)
CN1
GROUND 1
PREVIDEO OUT 2
+1.8V IN 3
SENSE UP CONT IN 4
+6 IN 5
NOT USED 6
YH OUT 7
LOW LIGHT INFO OUT 8
+8.6V IN 9
CP 3/W. HD/W.BL IN 10
TEMP INFO IN 11
ALC DET OUT 12
MAN R GAIN CONT IN 13
AGC CONT OUT 14
W. BL (NEGATIVE) IN 15
GAIN CONT IN 16
SC2 OUT 17
+4.9V IN 18
SC1 OUT 19
RSC IN 20
SC1 IN 21
1/2 fH IN 22
CP 2 IN 23
MAN B. GAIN CONT IN 24
AWC R OUT 25
B VR IN 26
YH OUT 27
AWC B CONT IN 28
R-Y OUT 29
R VR IN 30
+1.8V
+6.0V
+8.6V
+4.9V
(TO MOTHER BOARD---CN2)
CN2
B-Y OUT 1
AWC R CONT IN 2
PLAYBACK-II IN 3
AWC Y OUT 4
PLAYBACK-I IN 5
AWC B OUT 6
GROUND (VIDEO) 7
B DC CONT OUT 8
VIDEO IN/OUT : COLOR BAR IN 9
R DC CONT OUT 10
VIDEO OUT 11
ATW R IN 12
CHARACTER IN 13
ATW B IN 14
CP2/W. HD/C. BL IN 15
CP 5 IN 16
PEDESTAL CONT IN 17
GROUND 18
W. HD IN 19
SC 1 IN 20
EXT SC IN 21
GROUND 22
COLOR CORRECT IN 23
TEMP INFO OUT 24
EXT CHARACTER IN 25
BFP IN 26
NEG/POS CONT IN 27
APP OUT 28
FADE CONT IN 29
SYNC IN 30
SIGNAL PROCESSING CIRCUIT
(PREVIDEO-1)
TP1
IC1
CF1
LPF
(7.3MHz)
AMP
GAIN CONT
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
CF2
TRAP
3.58MHz
YH WHITE SUPPRESS
PULSE SEPA
AMP
AIC MODULATION
LOW LIGHT INDICATOR
AGC DET
AGC CONT
VR2
PEDESTAL
TP2
(PREVIDEO-2)
VR1
AGC GAIN
TP3
(YOUT)
V EDGE SIGNAL GENERATOR CIRCUIT
VIC2 (1/2)
CF1
YH LPF
(7.3MHz)
Q1~Q3
AMP
PROCESS VIC-3(a) BOARD
Q1
VR1
1H DELAY BIAS
DELAY BIAS
Q2
BUFFER
IC1
1H DELAY
(YH(1H) BIAS)
TP1
Q3, Q4
AMP
VR2
YH(1H) GAIN
CF1
LPF
(8.9MHz)
Q5
BUFFER
Q6
BUFFER
Q4, Q5
CLAMP
Q1
BUFFER
(YH(1H) OUT)
Q7
BUFFER
TP5
PROCES
Q1
DELA BIAS
CHROMA DETECT & WHITE BALANCE CIRCUIT
CF3
YL LPF
(0.8MHz)
IC2
CF4
LPF
(20MHz)
GAIN CONTROL
AMP
AMP
AMP
DETECTOR
R.SC PHASE SHIFTER
VR3
R/B GAIN
CF5
BPF
(5.37MHz)
VR4
PHASE DETECT
COLOR SIGNAL PROCESSING CIRCUIT
IC4
IC5
Q2
R-YL BUFFER
Q3
B-YL BUFFER
VR5
B-YL GAIN
CLAMP
LATCH
CLAMP
LATCH
R-YL GAIN CONT
B-YL GAIN CONT
YH MATRIX
MATRIX CONT
PULSE SEPA
YH DC CONT
B-YL GAIN CONT
R SUPP-/GAMMA
B SUPP-/GAMMA
AMP
TP8
(R-YL)
IC6
4 fsc GENERATOR
IC3
(R/B OUT)
TP4
DELAY BIAS
1H DELAY
AMP
AMP
CF6
LPF
(1.8MHz)
ATW/AWC GAIN CONTROL CIRCUIT
PROCESS VIC-2(2/2) BOARD
VR1
ATW R GAIN
IC1(d)
IC1(a)
AMP
AMP
VR3
R PRESET
VR2 ATW B GAIN
IC1(c)
IC1(b)
AMP
AMP
VR4
B PRESET
TITLE COLOR CORRECTION CIRCUIT
Q13, Q16
TITLE COLOR CORRECTION
Q14, Q15, Q20
EXT SC PHASE SHIFTER
VI
Q9, Q10
APERTURE AMP
Q8
APERTURE SUPPRESS
IC7
VR6
YH GAIN
CF7
YH DL
(240μsec)
Q17
CHROMA CONTROL

RAM OF PROCESS BOARD


PROCESS VIC-3(b) BOARD
VR1 2H DELAY BIAS
Q1 DELAY BIAS
BUFFER
Q2 BUFFER
IC1 1H DELAY
(YH(2H) BIAS)
TP1
Q3,Q4 AMP
CF1 LPF (8.9MHz)
Q5 BUFFER
VR2 YH(2H) GAIN
TP6 (YH(2H) OUT)
YH(H) OUT)
Q7 BUFFER
TP5
PROCESS VIC-4 BOARD
HORIZONTAL APERTURE GENERATOR CIRCUIT
CF2 DL (5.4MHz)
IC2
H. APERTURE GENERATOR
AMP
Q1, Q2 V. EDGE GENERATOR
CF1 LPF (3.9MHz)
IC1 AMP
TP1 (V EDGE)
VR1 V EDGE BALANCE
CHROMA ENCODING CIRCUIT
PROCESS VIC-1 BOARD
IC1
PULSE SEPA
H.APERTURE SUPPRESS
Q1, Q2 MATRIX
VR1 R MATRIX
R-YL CLAMP
R-YL DETECTION
R-YL BALANCED MODULATOR
CHROMA CLIP/SUPPRESS
SYNC CLAMP
REFERENCE DETECTION
B-YL BALANCED MODULATOR
MATRIX Q3, Q4
B-YL CLAMP
B-YL DETECTION
VR2 CHROMA GAIN
Q6 BURST ELIMINATOR
Q5 BURST GATE
VR3 BURST GAIN
Q7, Q8 BURST PHASE SHIFTER
CT1 BURST REFERENCE PHASE
IC8 CHROMA CLIP
VR7 CHROMA CLIP
IC2(a)(b) APERTURE OUTPUT
VR4 BURST 90° PHASE
Q9 SC PHASE SHIFTER
Q10 SC PHASE SHIFTER
Q10 SC PHASE SHIFTER
Q11, Q12 CHROMA PHASE SHIFTER
CT2 CHROMA PHASE
PEDESTAL CONTROL CIRCUIT
Q13-Q15 PEDESTAL CONTROL
Q12 PEDESTAL CONTROL
VIDEO SIGNAL PROCESSING CIRCUIT
Q8 APERTURE SUPPRESS
IC7
CF7 YH DL (240μsec)
Y/CHROMA APERTURE MIX
CHROMA GAIN CONT
FADE CONT
NEGA/POSI SELECT
TEXT NEGA/POSI CONT
VIDEO GATE
CHARACTER MIX
Q11 BUFFER
CLAMP
BL MIX HIGH CLIP LOW CLIP
BURST SYNC MIX
PLAYBACK CONT
VIDEO OUT
PULSE SEPA
(VIDEO OUT) TP7
TP9 (GROUND)
PROCESS SUB BOARD
IC401 FLARE COMPENSATION

PROCESS BOARD

IC1	HB31		E3, E4
IC2	HB12		D3, D4
IC3	HB18		C3
IC4	NJM4053BM		D5
IC5	AN2361S		D6, D7
IC6	MN3106S		C9
IC7	AN2210SA		A10, A11
IC8	HB16		E17
Q1	2SB709-Q	[A]	E10
Q2	2SD601-QR	[Y]	D5
Q3	2SD601-QR	[Y]	D5
Q4	2SC2404-CD	[U]	E9
Q5	2SC2404-CD	[U]	E9
Q6	2SD601-QR	[Y]	E9
Q7	2SB709-Q	[A]	E9
Q8	2SK198-Q	[10]	B8
Q9	2SC2404-CD	[U]	B8
Q10	2SD601-QR	[Y]	B8
Q11	2SB709-Q	[A]	B11
Q12	2SD601-QR	[Y]	B16
Q13	2SD601-QR	[Y]	B7
Q14	2SB709-Q	[A]	B7
Q15	2SC2404-CD	[U]	B7
Q16	2SD601-QR	[Y]	B7
Q17	2SD601-QR	[Y]	A8
Q20	2SC2404-CD	[U]	A7
D1	MA151K	[MH]	B11
D2	MA151K	[MH]	B11
D301	MA165		E2

PROCESS VIC-1 BOARD

IC1	AN2410S		D14
IC2	NJM319M		C14
Q1	2SD601-QR	[Y]	D13
Q2	2SD601-QR	[Y]	E13
Q3	2SD601-QR	[Y]	D13
Q4	2SD601-QR	[Y]	D13
Q5	2SK198-Q	[10]	E15
Q6	2SK198-Q	[10]	E16
Q7	2SD601-QR	[Y]	D16
Q8	2SC2404-CD	[U]	D16
Q9	2SB709-Q	[A]	C15
Q10	2SB709-Q	[A]	C16
Q11	2SA1022-CD	[E]	B14
Q12	2SC2404-CD	[U]	B13
Q13	2SD601-QR	[Y]	B14
Q14	2SD601-QR	[Y]	B15
Q15	2SB709-Q	[A]	B15
D1	MA151K	[MH]	E14

PROCESS VIC-2 BOARD

IC1	NJM2902M		B5, B6
Q1	2SC2405STU	[S]	E6
Q2	2SC2404-CD	[U]	E6
Q3	2SC2404-CD	[U]	E6

PRQCESS VIC-3 (a) BOARD

IC1	MN3802A		E7
Q1	2SB709-Q	[A]	E7
Q2	2SD601-QR	[Y]	E7
Q3	2SC2404-CD	[U]	E8
Q4	2SC2404-CD	[U]	E8
Q5	2SD601-QR	[Y]	E9

PROCESS VIC-3 (b) BOARD

IC1	MN3802A		E11
Q1	2SB709-Q	[A]	E10
Q2	2SD601-QR	[Y]	E10
Q3	2SC2404-CD	[U]	E11
Q4	2SC2404-CD	[U]	E12
Q5	2SD601-QR	[Y]	E12

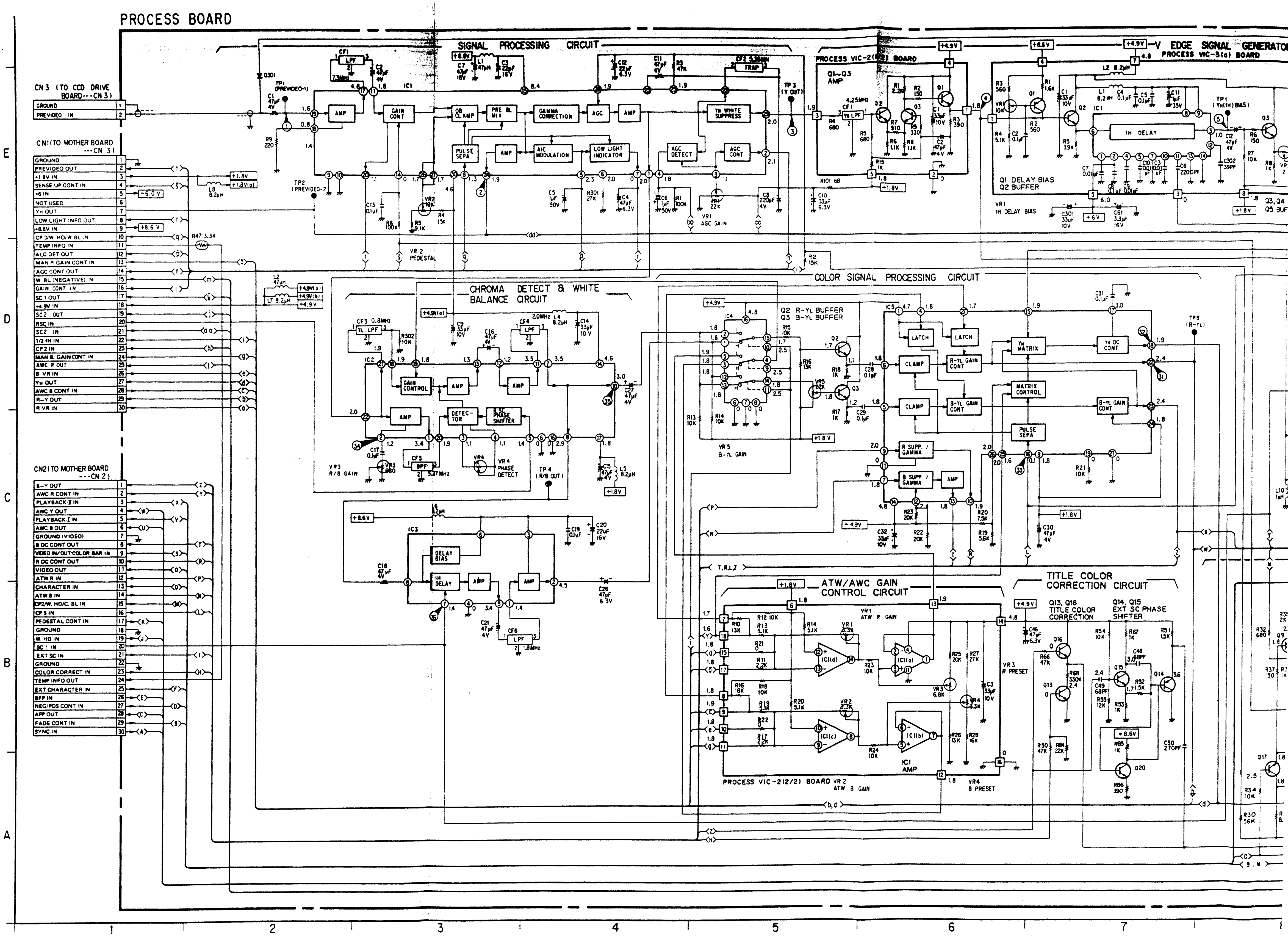
PROCESS VIC-4 BOARD

IC1	AN608		C11
IC2	AN2020S		C12, D12
Q1	2SC2404-CD	[U]	C10
Q2	2SD601-QR	[Y]	C10
D1	1SS108		C11
D2	1SS108		C11

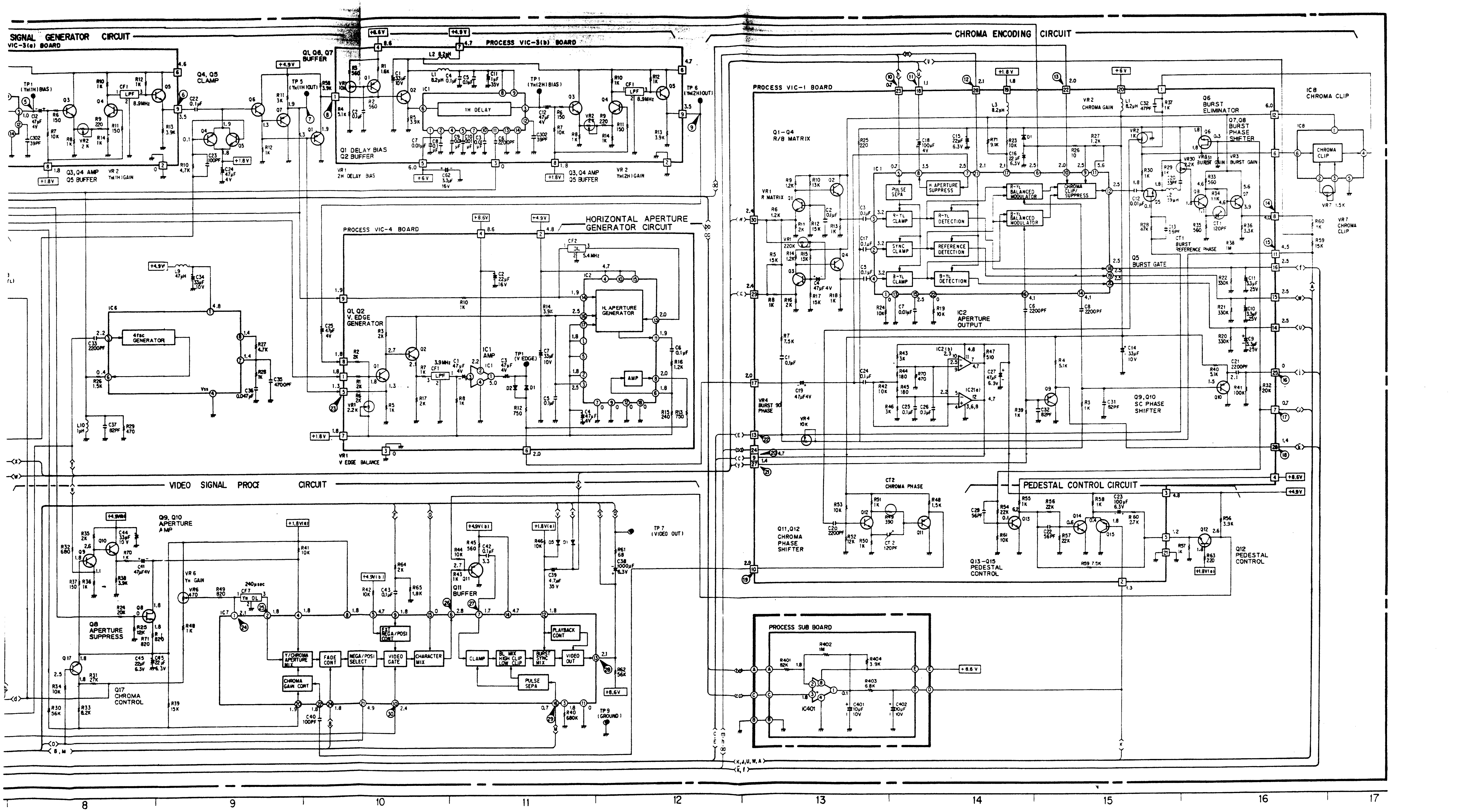
PROCESS SUB BOARD

IC401	NJM2903M		A13

SCHEMATIC DIAGRAM OF P


PROCESS BOARD
SIGNAL PROCESSING CIRCUIT
CN3 (TO CCD DRIVE BOARD---CN3)
CN1 (TO MOTHER BOARD ---CN 3)
CN2 (TO MOTHER BOARD ---CN 2)
PROCESS VIC-2(1/2) BOARD
Q1~Q3 AMP
V EDGE SIGNAL GENERATOR
PROCESS VIC-3(a) BOARD
Q1 DELAY BIAS
Q2 BUFFER
VR1 1H DELAY BIAS
1H DELAY
CHROMA DETECT & WHITE BALANCE CIRCUIT
COLOR SIGNAL PROCESSING CIRCUIT
Q2 R-YL BUFFER
Q3 B-YL BUFFER
ATW/AWC GAIN CONTROL CIRCUIT
TITLE COLOR CORRECTION CIRCUIT
Q13, Q16 TITLE COLOR CORRECTION
Q14, Q15 EXT SC PHASE SHIFTER
PROCESS VIC-2(2/2) BOARD VR2 ATW B GAIN
VR1 ATW R GAIN
VR3 R PRESET
VR4 B PRESET
VR1 AGC GAIN
VR2 PEDESTAL
VR3 R/B GAIN
VR4 PHASE DETECT
VR5 B-YL GAIN
TP1 (PREVIDEO-1)
TP2 (PREVIDEO-2)
TP3 (Y OUT)
TP4 (R/B OUT)
TP8 (R-YL)
AMP
GAIN CONT
CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
YH WHITE SUPPRESS
PULSE SEPA
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONT
GAIN CONTROL
DETEC-TOR
PHASE SHIFTER
DELAY BIAS
1H DELAY
LATCH
Y H MATRIX
Y H DC CONT
R-YL GAIN CONT
B-YL GAIN CONT
MATRIX CONTROL
R SUPP./GAMMA
B SUPP./GAMMA
GROUND
PREVIDEO IN
1
2
3
4
5
6
7
8
A
B
C
D
E

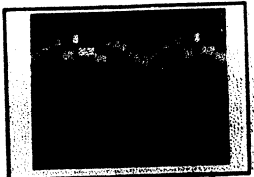
M OF PROCESS BOARD



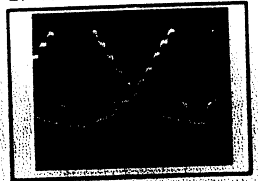
SIGNAL GENERATOR CIRCUIT
VIC-3(a) BOARD
Q3, Q4 AMP
Q5 BUFFER
Q4, Q5 CLAMP
Q1, Q6, Q7 BUFFER
PROCESS VIC-3(b) BOARD
1H DELAY
Q1 DELAY BIAS
Q2 BUFFER
Q3, Q4 AMP
Q5 BUFFER
CHROMA ENCODING CIRCUIT
PROCESS VIC-1 BOARD
Q1-Q4
R/B MATRIX
PULSE SEPA
H APERTURE SUPPRESS
R-Y1 CLAMP
R-Y1 DETECTION
SYNC CLAMP
REFERENCE DETECTION
B-Y1 CLAMP
B-Y1 DETECTION
R-Y1 BALANCED MODULATOR
B-Y1 BALANCED MODULATOR
CHROMA CLIP/ SUPPRESS
IC2 APERTURE OUTPUT
Q5 BURST GATE
Q6 BURST ELIMINATOR
Q7, Q8 BURST PHASE SHIFTER
IC8 CHROMA CLIP
CHROMA CLIP
Q9, Q10 SC PHASE SHIFTER
HORIZONTAL APERTURE GENERATOR CIRCUIT
PROCESS VIC-4 BOARD
Q1, Q2 V. EDGE GENERATOR
IC1 AMP
H. APERTURE GENERATOR
AMP
VR1 V EDGE BALANCE
IC6
4fsc GENERATOR
VIDEO SIGNAL PROCESS CIRCUIT
Q9, Q10 APERTURE AMP
Q8 APERTURE SUPPRESS
Q17 CHROMA CONTROL
VR6 YH GAIN
Q11 BUFFER
Y/CHROMA APERTURE MIX
CHROMA GAIN CONT
FADE CONT
NEGA/POSI SELECT
VIDEO GATE
CHARACTER MIX
EXT NEGA/POSI CONT
CLAMP
BL MIX HIGH CLIP LOW CLIP
BURST SYNC MIX
VIDEO OUT
PLAYBACK CONT
PULSE SEPA
TP 7 (VIDEO OUT)
TP 9 (GROUND)
CT2 CHROMA PHASE
Q11, Q12 CHROMA PHASE SHIFTER
Q13-Q15 PEDESTAL CONTROL
PEDESTAL CONTROL CIRCUIT
Q12 PEDESTAL CONTROL
PROCESS SUB BOARD
IC401
8
9
10
11
12
13
14
15
16
17

CONDUCTOR VIEW OF

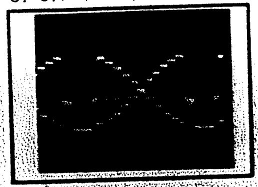
1. 50mV/DIV, 10µs/DIV



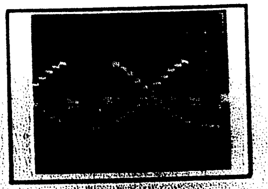
2. 0.1V/DIV, 10µs/DIV



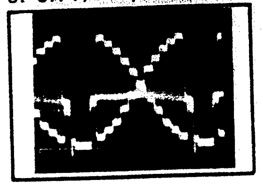
3. 0.1V/DIV, 10µs/DIV



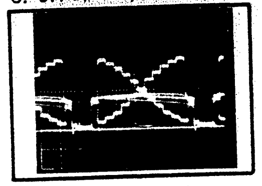
4. 0.1V/DIV, 10µs/DIV



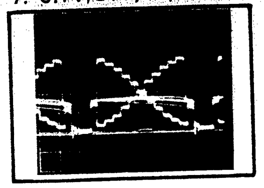
5. 0.1V/DIV, 10µs/DIV



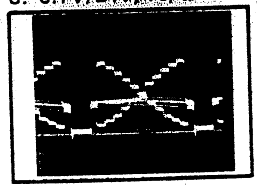
6. 0.1V/DIV, 10µs/DIV



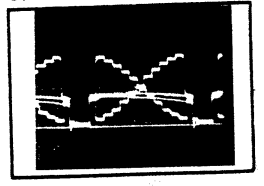
7. 0.1V/DIV, 10µs/DIV



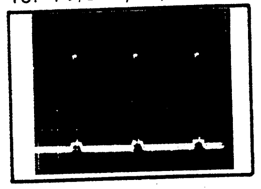
8. 0.1V/DIV, 10µs/DIV



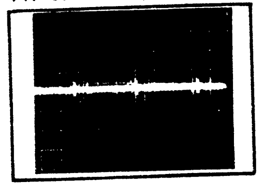
9. 0.1V/DIV, 10µs/DIV



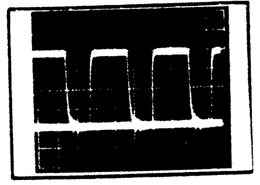
10. 1V/DIV, 20µs/DIV



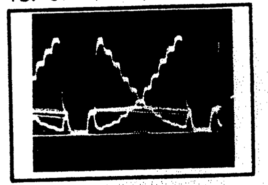
11. 0.1V/DIV, 20µs/DIV



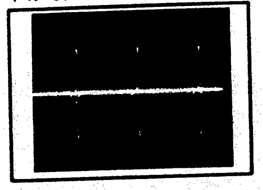
12. 0.2V/DIV, 20µs/DIV



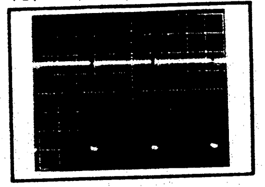
13. 0.1V/DIV, 10µs/DIV



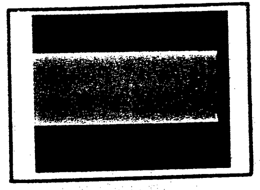
14. 0.1V/DIV, 20µs/DIV



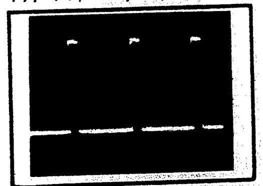
15. 1V/DIV, 20µs/DIV



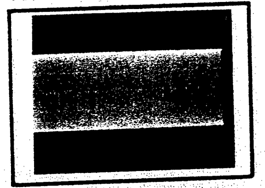
16. 0.1V/DIV, 20µs/DIV



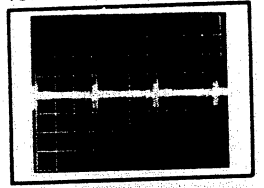
17. 1V/DIV, 20µs/DIV



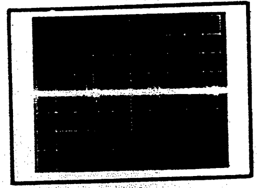
18. 0.1V/DIV, 20µs/DIV



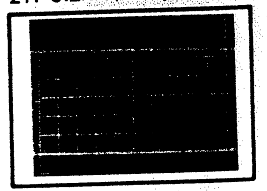
19. 50mV/DIV, 20µs/DIV



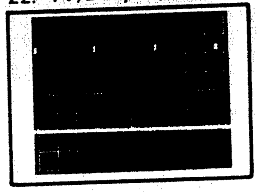
20. 50mV/DIV, 20µs/DIV



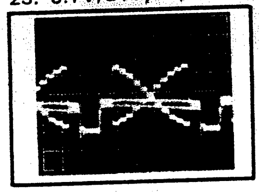
21. 0.2mV/DIV, 20µs/DIV



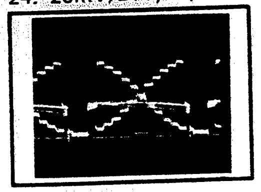
22. 1V/DIV, 20µs/DIV



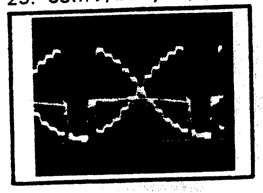
23. 0.1V/DIV, 10µs/DIV



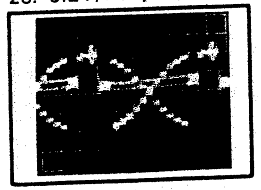
24. 20mV/DIV, 10µs/DIV



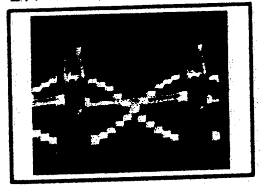
25. 50mV/DIV, 10µs/DIV



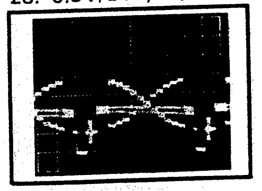
26. 0.2V/DIV, 10µs/DIV



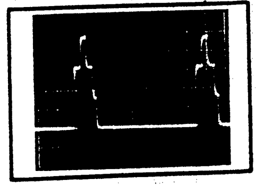
27. 0.2V/DIV, 10µs/DIV



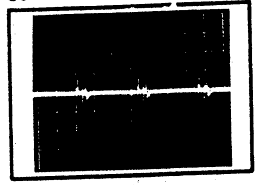
28. 0.5V/DIV, 10µs/DIV



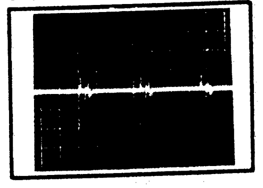
29. 1V/DIV, 10µs/DIV



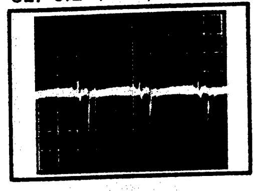
30. 0.2V/DIV, 20µs/DIV



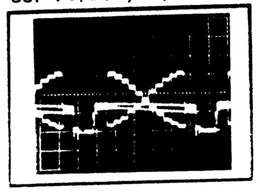
31. 20mV/DIV, 20µs/DIV



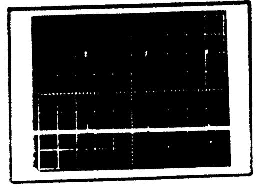
32. 0.2V/DIV, 10µs/DIV



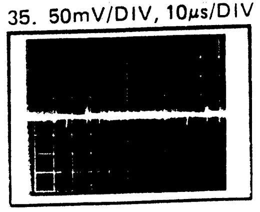
33. 1V/DIV, 20µs/DIV



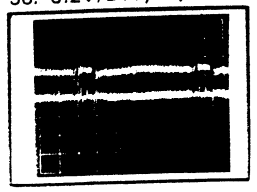
34. 50mV/DIV, 10µs/DIV



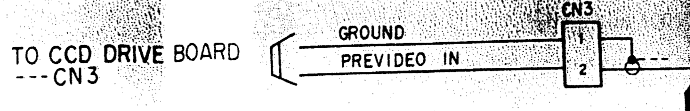
35. 50mV/DIV, 10µs/DIV



36. 0.2V/DIV, 10µs/DIV



PROCESS BOARD

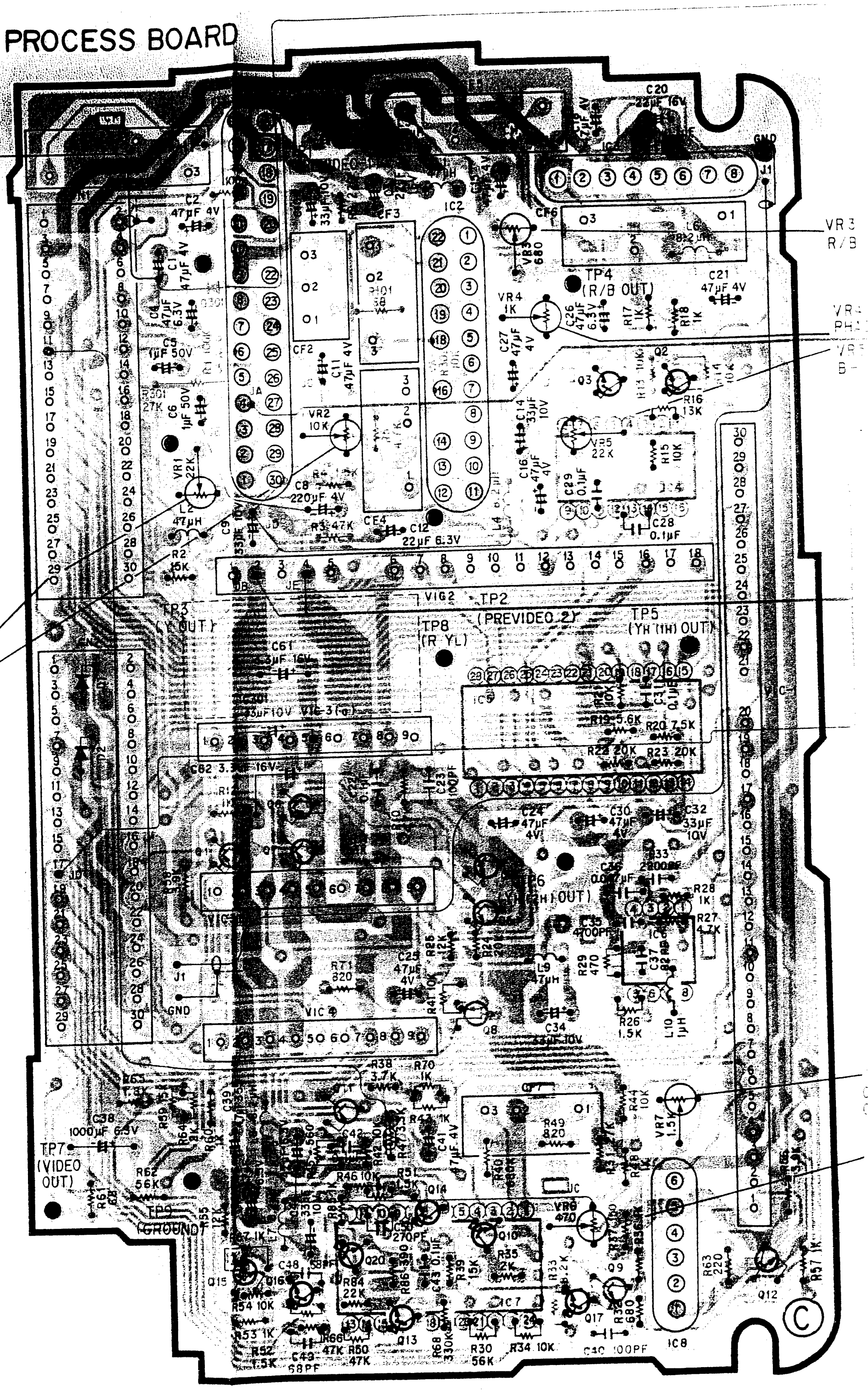

TO CCD DRIVE BOARD
---CN3
GROUND
PREVIDEO IN
CN3
1
2

CN1 (TO MOTHER BOARD----CN 3)

1	GROUND	2	PREVIDEO OUT
3	+1.8V IN	4	SENSE UP CONT IN
5	+6 IN	6	NOT USED
7	YH OUT	8	LOW LIGHT INFO OUT
9	-8.6V IN	10	CP3/W.HD/W.BL IN
11	TEMP INFO IN	12	ALC DET OUT
13	MAN R GAIN CONT IN	14	AGC CONT OUT
15	W. BL (NEGATIVE) IN	16	GAIN CONT IN
17	SC 1 OUT	18	+4.9V IN
19	SC2 OUT	20	RSC IN
21	SC2 IN	22	1/2 fH IN
23	CP 2 IN	24	MAN B. GAIN CONT IN
25	AWC R OUT	26	B VR IN
27	YH OUT	28	AWC B CONT IN
29	R-Y OUT	30	R VR IN

CN 2 (TO MOTHER BOARD----CN 2)

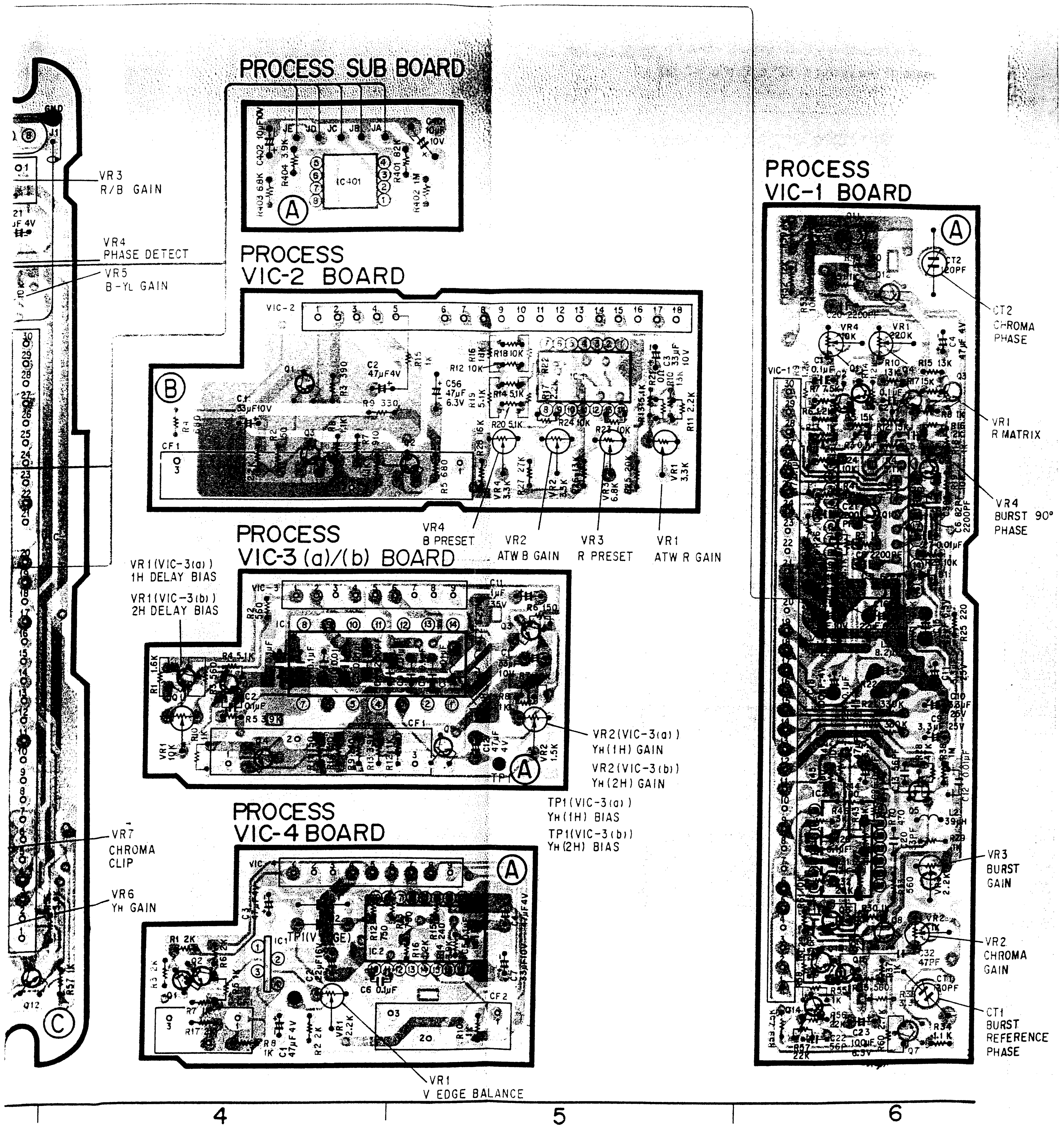
1	B-Y OUT	2	AWC R CONT IN
3	PLAYBACK II IN	4	AWC Y OUT
5	PLAYBACK I IN	6	AWC B OUT
7	GROUND (VIDEO)	8	B DC CONT OUT
9	VIDEO IN/OUT COLOR BAR IN	10	R DC CONT OUT
11	VIDEO OUT	12	ATW R IN
13	CHARACTER IN	14	ATW B IN
15	CP2/W. HD/C. BL IN	16	CP 5 IN
17	PEDESTAL CONT IN	18	GROUND
19	W. HD IN	20	SC 1 IN
21	EXT SC IN	22	GROUND
23	COLOR CORRECT IN	24	TEMP INFO OUT
25	EXT CHARACTER IN	26	BFP IN
27	NEG/POS CONT IN	28	APP OUT
29	FADE CONT IN	30	SYNC IN


VR1
AGC GAIN
VR2
PEDESTAL
TP4 (R/B OUT)
TP2 (PREVIDEO 2)
TP3 (Y OUT)
TP8 (R YL)
TP5 (YH (1H) OUT)
TP7 (VIDEO OUT)
TP6 (GROUND)
IC2
IC8
GND
J1
C

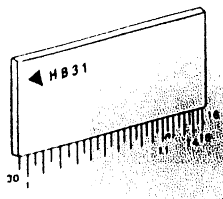
COMPONENT SIDE
PATTERN SIDE

C
B
A
1
2
3

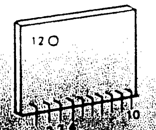
VIEW OF PROCESS BOARD


PROCESS SUB BOARD
PROCESS VIC-1 BOARD
PROCESS VIC-2 BOARD
PROCESS VIC-3 (a)/(b) BOARD
PROCESS VIC-4 BOARD
IC401
VR3 R/B GAIN
VR4 PHASE DETECT
VR5 B-YL GAIN
VR1(VIC-3(a)) 1H DELAY BIAS
VR1(VIC-3(b)) 2H DELAY BIAS
VR7 CHROMA CLIP
VR6 YH GAIN
VR4 B PRESET
VR2 ATW B GAIN
VR3 R PRESET
VR1 ATW R GAIN
VR2(VIC-3(a)) YH(1H) GAIN
VR2(VIC-3(b)) YH(2H) GAIN
TP1(VIC-3(a)) YH(1H) BIAS
TP1(VIC-3(b)) YH(2H) BIAS
VR1 V EDGE BALANCE
CT2 CHROMA PHASE
VR1 R MATRIX
VR4 BURST 90° PHASE
VR3 BURST GAIN
VR2 CHROMA GAIN
CT1 BURST REFERENCE PHASE
A
B
C
4
5
6

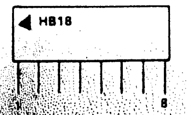
HB31



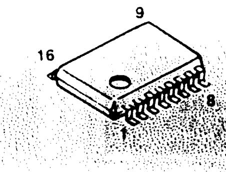
HB12



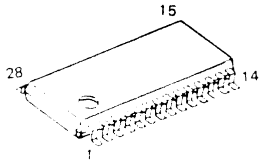
HB18



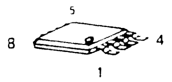
NJM4053BM



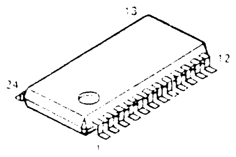
AN2361S



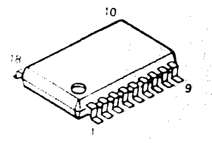
MN3106S
NJM2903M



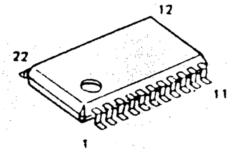
AN2210SA



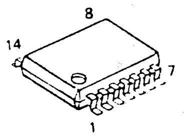
AN2020S



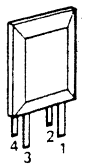
AN2410S



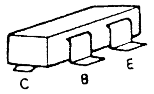
NJM319M
NJM2902M



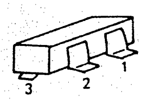
AN608



2SA1022-CD
2SB709-Q
2SC2404-CD
2SC2405STU
2SD601-QR

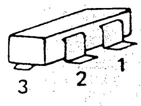


2SK198-Q



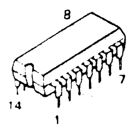
1 : Drain
2 : Source
3 : Gate

MA151K

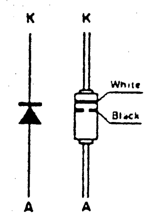


1 : NC
2 : Anode
3 : Cathode

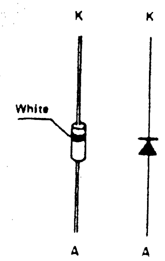
MN3802A



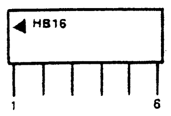
1SS108



MA165



HB16



PROCESS BOARD

IC1	HB31		C2
IC2	HB12		C3
IC3	HB18		C3
IC4	NJM4053BM		C3
IC5	AN2361S		B3
IC6	MN3106S		B3
IC7	AN2210SA		A3
IC8	HB16		A3
Q1	2SB709-Q	[A]	B2
Q2	2SD601-QR	[Y]	C3
Q3	2SD601-QR	[Y]	C3
Q4	2SC2404-CD	[U]	B3
Q5	2SC2404-CD	[U]	B3
Q6	2SD601-QR	[Y]	B2
Q7	2SB709-Q	[A]	B2
Q8	2SK198-Q	[1O]	A3
Q9	2SC2404-CD	[U]	A3
Q10	2SD601-QR	[Y]	A2
Q11	2SB709-Q	[A]	A3
Q12	2SD601-QR	[Y]	A3
Q13	2SD601-QR	[Y]	A2
Q14	2SB709-Q	[A]	A2
Q15	2SC2404-CD	[U]	A2
Q16	2SD601-QR	[Y]	A2
Q17	2SD601-QR	[Y]	A2
Q20	2SC2404-CD	[U]	A2
D1	MA151K	[MH]	B2
D2	MA151K	[MH]	B2
D301	MA165		C2

PROCESS VIC-1 BOARD

IC1	AN2410S		B6
IC2	NJM319M		A6
Q1	2SD601-QR	[Y]	B6
Q2	2SD601-QR	[Y]	B6
Q3	2SD601-QR	[Y]	C6
Q4	2SD601-QR	[Y]	C6
Q5	2SK198-Q	[1O]	A6
Q6	2SK198-Q	[1O]	A6
Q7	2SD601-QR	[Y]	A6
Q8	2SC2404-CD	[U]	A6
Q9	2SB709-Q	[A]	B6
Q10	2SB709-Q	[A]	B6
Q11	2SA1022-CD	[E]	C6
Q12	2SC2404-CD	[U]	C6
Q13	2SD601-QR	[Y]	A6
Q14	2SD601-QR	[Y]	A6
Q15	2SB709-Q	[A]	A6
D1	MA151K	[MH]	B6

PROCESS VIC-2 BOARD

IC1	NJM2902M		C5
Q1	2SC2405STU	[S]	C4
Q2	2SC2404-CD	[U]	C5
Q3	2SC2404-CD	[U]	C4

PROCESS VIC-3 (a)/(b) BOARD

IC1	MN3802A		B4, B5
Q1	2SB709-Q	[A]	B4
Q2	2SD601-QR	[Y]	B4
Q3	2SC2404-CD	[U]	B5
Q4	2SC2404-CD	[U]	B4
Q5	2SD601-QR	[Y]	B5

PROCESS VIC-4 BOARD

IC1	AN608		A4
IC2	AN2020S		A5
Q1	2SC2404-CD	[U]	A4
Q2	2SD601-QR	[Y]	A4
D1	1SS108		A4
D2	1SS108		A4

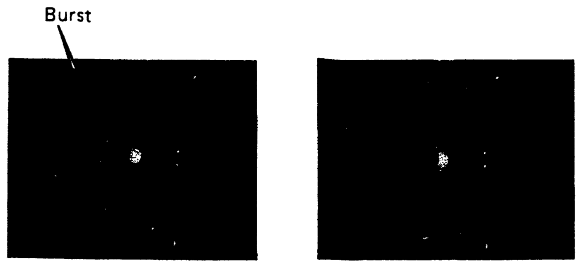
PROCESS SUB BOARD

IC401	NJM2903M		C4

(22) Burst and chroma adjustment

Test point:	Video output connector	
Adjust:	VR1 (CHROMA GAIN)	VIC1/Process board
	VR3 (BURST GAIN)	VIC1/Process board
	VR4 (BURST 90° PHASE)	VIC1/Process board
	VR5 ($B\text{-}Y_L$ GAIN)	Process board
	VR6 (R MATRIX)	VIC1/Process board
	VR7 (CHROMA CLIP)	Process board
	CT2 (CHROMA PHASE)	VIC1/Process board

- o Connect the Video Output Connector to the vectorscope.
- o Aim the camera at the color chart so that the chart fully occupies the raster of the color video monitor.
- o Adjust the Phase Control of the vectorscope so that the burst vectors position on the burst axes on the vectorscope. If not, adjust VR3 (BURST GAIN) and VR4 (BURST 90° PHASE) so that the burst vectors position at 75% on the burst axes. (Fig. 5-2-34)



NO GOOD **GOOD**

Fig. 5-2-34

- o Turn VR7 (CHROMA CLIP) fully clockwise to release the chroma clipping.
- o Adjust VR1 (CHROMA GAIN) on the VIC1/Process board so that the red vector is 180% ± 25% as compares to the burst vector on the vectorscope. (Fig. 5-2-35)

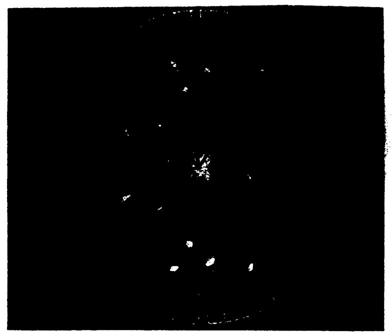


Fig. 5-2-35

- o Adjust VR5 ($B\text{-}Y_L$ GAIN) on the Process board so that the yellow vector is 135% ± 25% as compares to the burst vector. (Fig. 5-2-36)

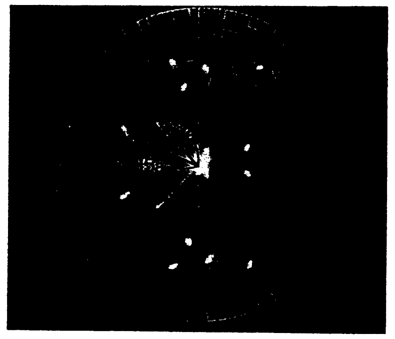


Fig. 5-2-36

- o Set the vectorscope to the NTSC mode and adjust the Phase Control of the vectorscope so that burst vectors coincide each other. Adjust CT2 (CHROMA PHASE) so that the red vectors for odd and even field coincide each other and adjust VR6 (R MATRIX) so that the phase of red vectors becomes 102° ± 5°. (Fig. 5-2-37)

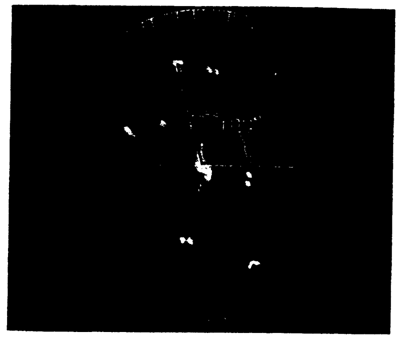


Fig. 5-2-37

- o Repeat adjusting VR1 (CHROMA GAIN), VR5 ($B\text{-}Y_L$ GAIN), CT2 (CHROMA PHASE) and VR6 (R MATRIX) so that the red vector and the yellow vector are 180% ± 25% and 135% ± 25% respectively as compare to the burst vector and the phase of red vector is 102° ± 5°. (Fig. 5-2-38)

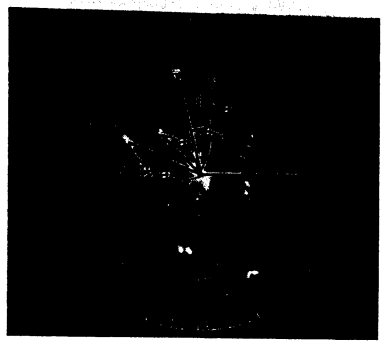


Fig. 5-2-38

- o Mount the ATW sensor to the ATW sensor connector on the camera or on the viewfinder mounting angle (Fig. 5-2-41 and Fig. 5-2-42) and set the White Balance Selection Switch to the lower (ATW) position.
- o Turn VR2 (R ATW ADJ) on the ATW VIC-1 board fully clockwise and then adjust VR7 (CHROMA CLIP) so that the red vector is clipped at 233% ± 5% as compares to the burst vector. (Fig. 5-2-39) After adjusting VR7, readjust VR2 while referring to (3) White balance sensor adjustment on page 2-26.

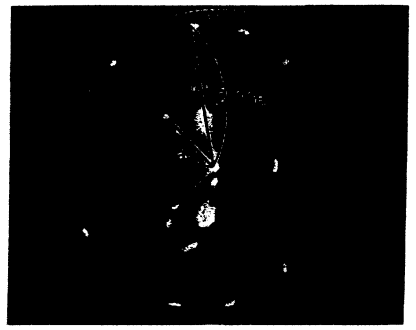


Fig. 5-2-39

LIST OF MODIFICATION

■ Process Board

- **Process Board assembly has been changed for the flare compensation from serial No.71A00001 and higher.**

  Note : Either YFVKB3260E1A or YFVKB3260E1B of Process board assembly is adopted on the production between serial No. 71AXXXXX and 73AXXXXX.

■ Process VIC-1 Board

- R59 has been changed to compensate the pedestal level.
- R71 has been added to shifting the color reproduction.

■ Process Sub Board

- Process Sub Board has been added on the Process board for the flare compensation.

REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by "o" mark are new parts used from this model.
3. Complete printed circuit board assembly is not available as replacement part.

SYMBOL NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
COLOUR VIDEO CAMERA WVP-F10			
PROCESS BOARD			
PCB1	YFVKB3260E1A	o YFVKB3260E1B	Printed Circuit Board Assy
PROCESS VIC-1 BOARD			
R59	YF2116682JT	YF2116752JT	Carbon 7.5K ohms 1/16W
R71	———	ERD10TJ912	Carbon 9.1K ohms 1/8W
PROCESS SUB BOARD			
PCB19	———	o YFVKYOF10B2A1A	Printed Circuit Board Assy
IC401	———	NJM2903M	IC
R401	———	YF2116823JT	Carbon 82K ohms 1/16W
R402	———	YF2116105JT	Carbon 1M ohms 1/16W
R403	———	YF2116682JT	Carbon 6.8K ohms 1/16W
C401,402	———	ECSF1AE106	Tantalum 10 µF 10V

Printed in Japan
B–429 Ⓝ10